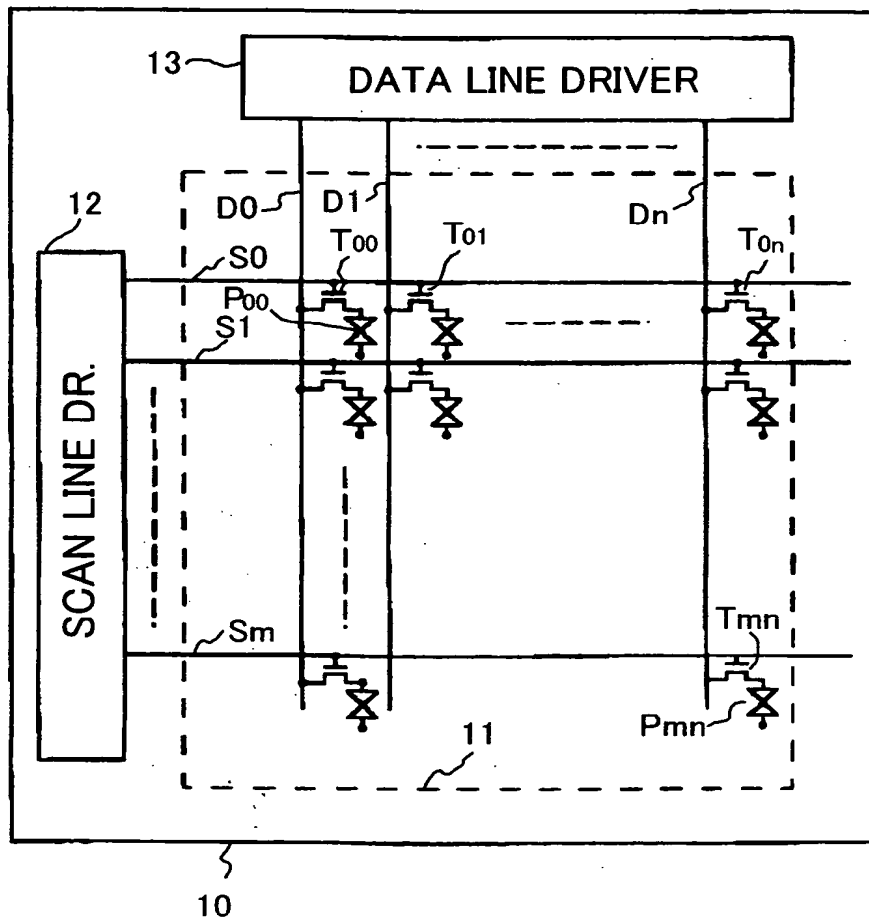


FIG. 1



1)

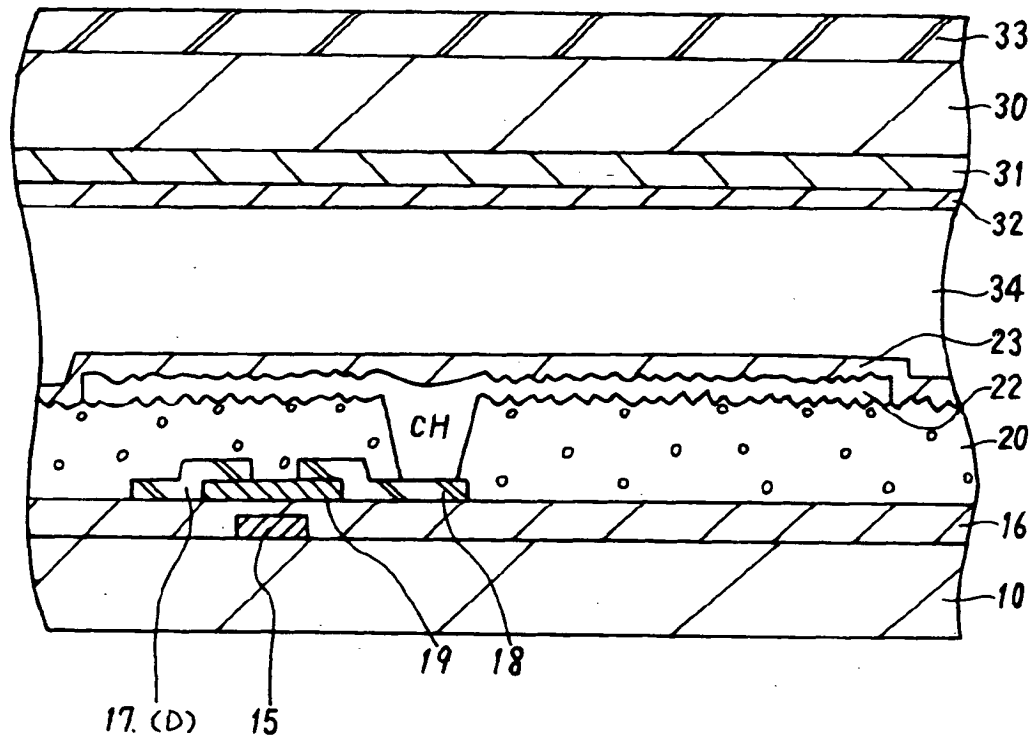


FIG. 3A

Resist deposition  
 Pre-baking

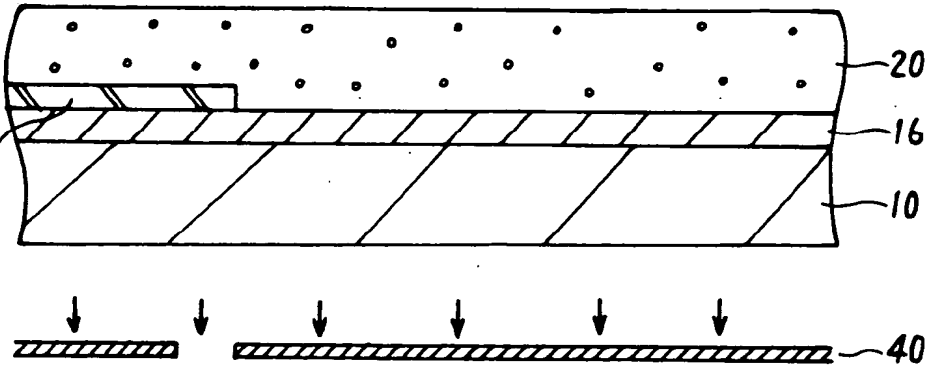


FIG. 3B

Exposure &  
 Development  
 for contact hole,  
 Post-baking

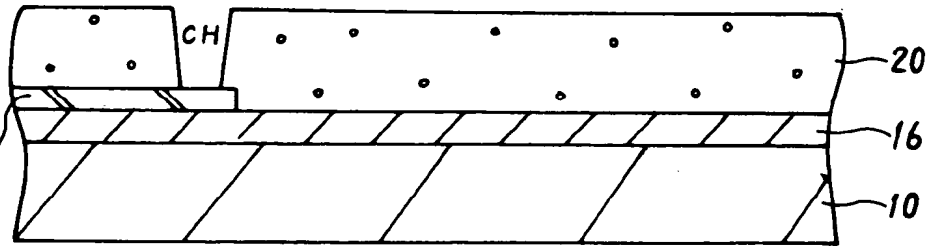


FIG. 3C

DUV irradiation

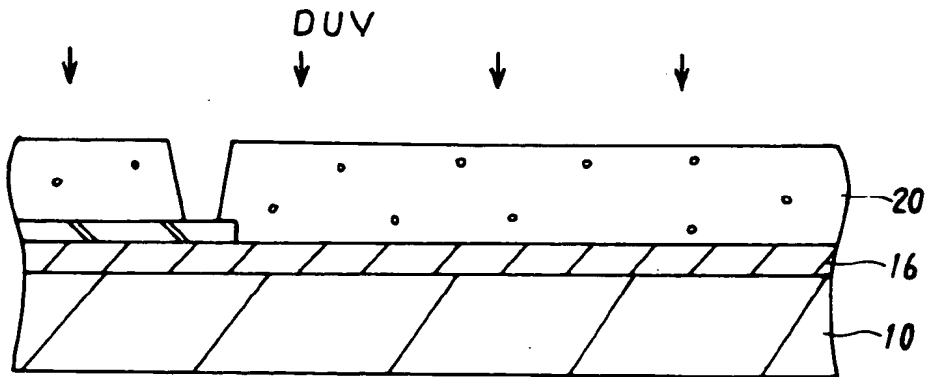


FIG. 3D

Final baking

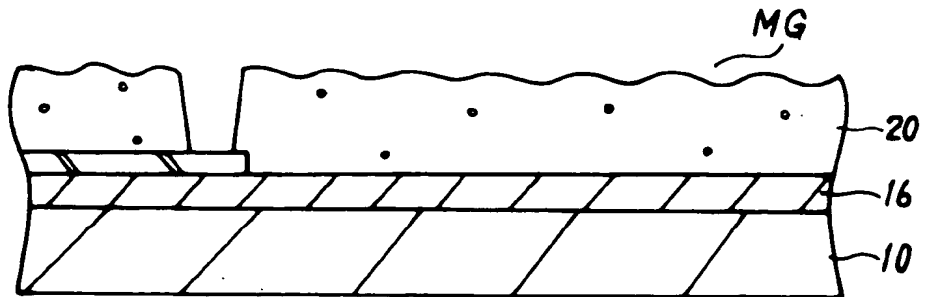


FIG. 4

Thickness  $2\mu\text{m}$

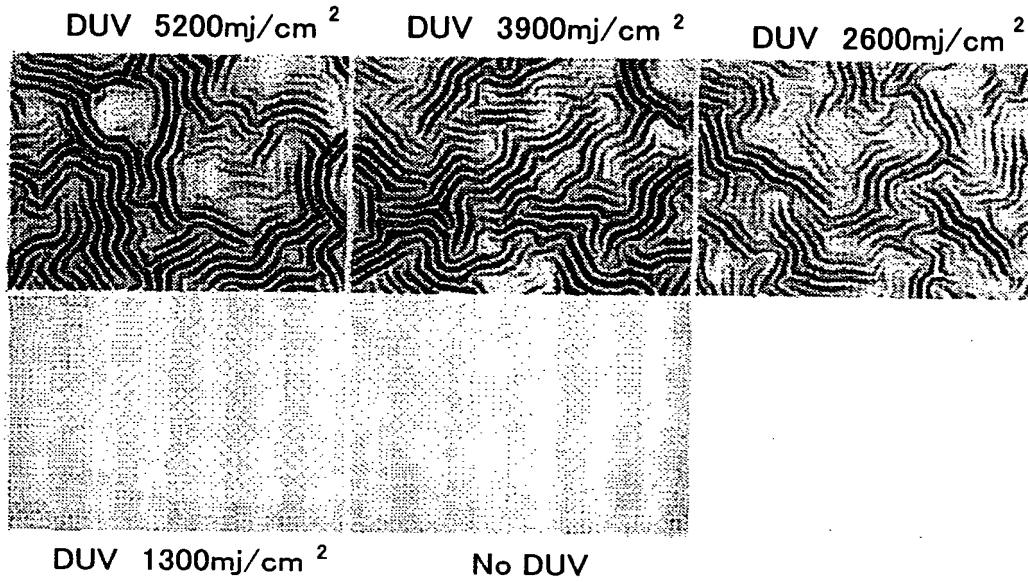


FIG. 5

Thickness  $1.7\mu\text{m}$

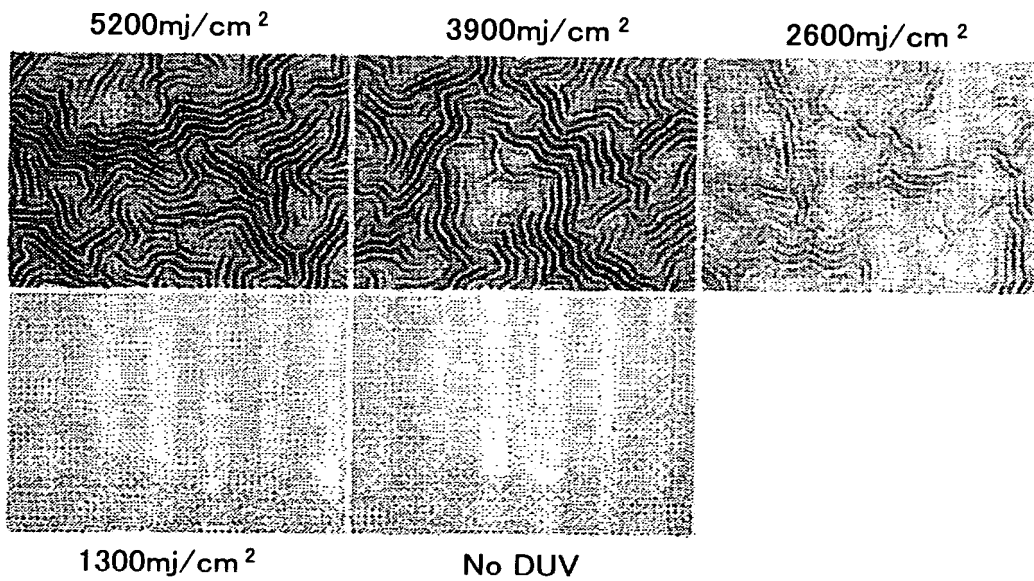


FIG. 6

Thickness  $1.4 \mu\text{m}$

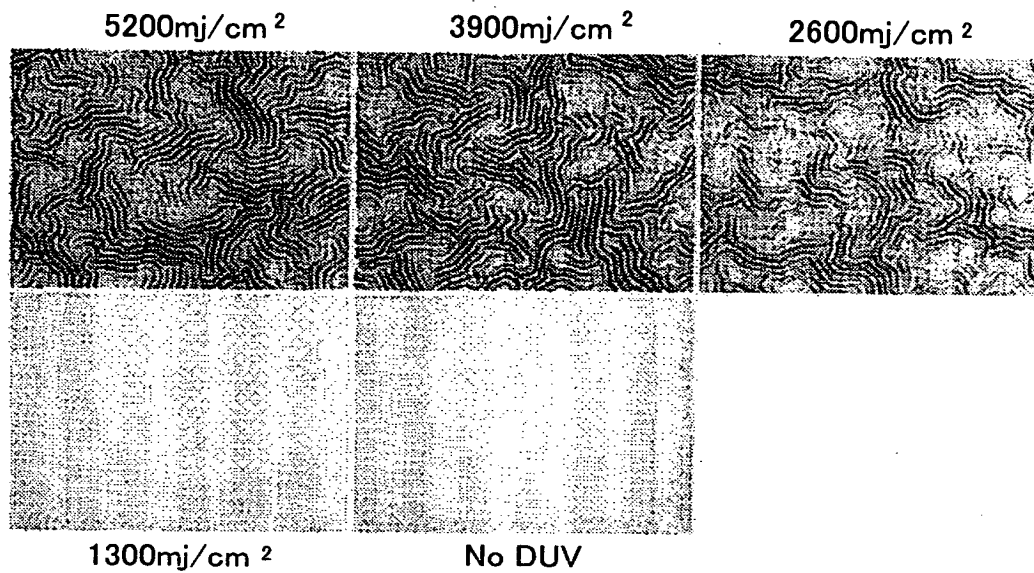
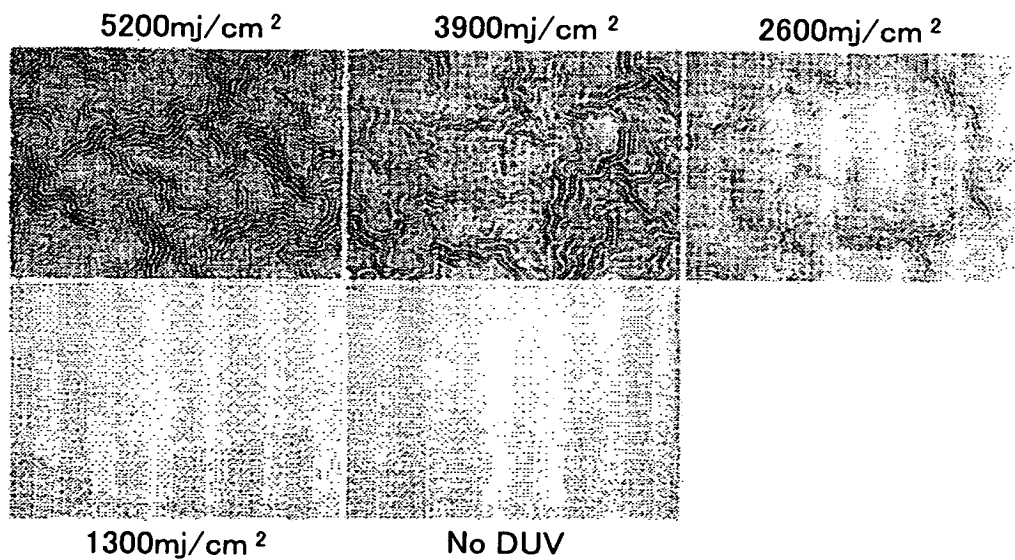


FIG. 7

Thickness  $1.0 \mu\text{m}$

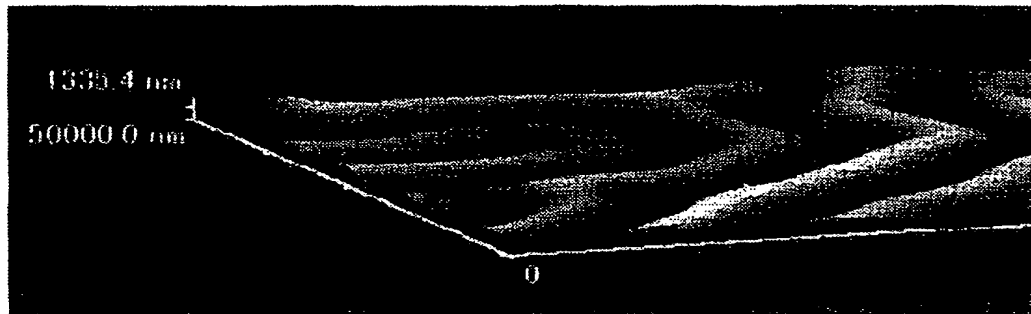


**FIG. 8A**

Thickness  $1.7 \mu\text{m}$

Average inclination angle  $k=13^\circ$

Height difference of undulation :  $1.3 \mu\text{m}$

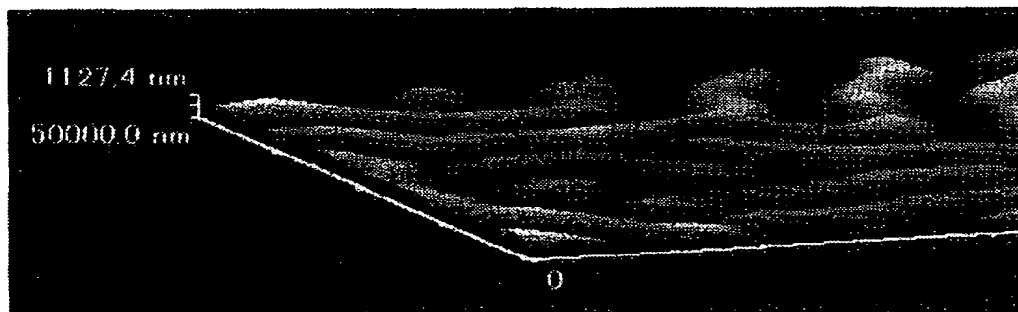


**FIG. 8B**

Thickness  $1.4 \mu\text{m}$

Average inclination angle  $k=11^\circ$

Height difference of undulation :  $1.1 \mu\text{m}$



**FIG. 8C**

Thickness  $1 \mu\text{m}$

Average inclination angle  $k=8^\circ$

Height difference of undulation :  $0.5 \mu\text{m}$

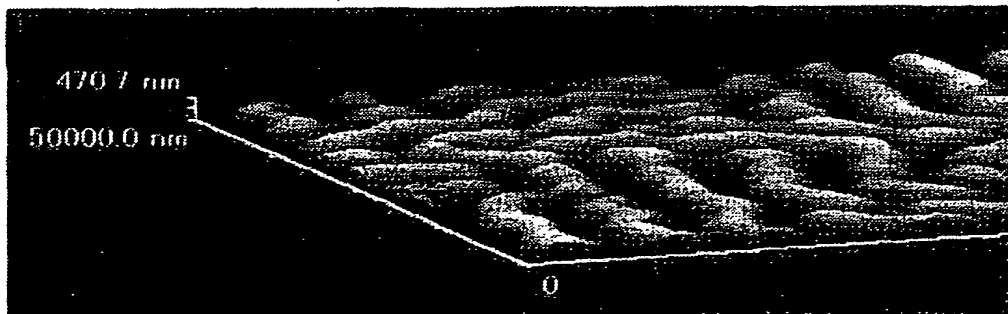


FIG. 9

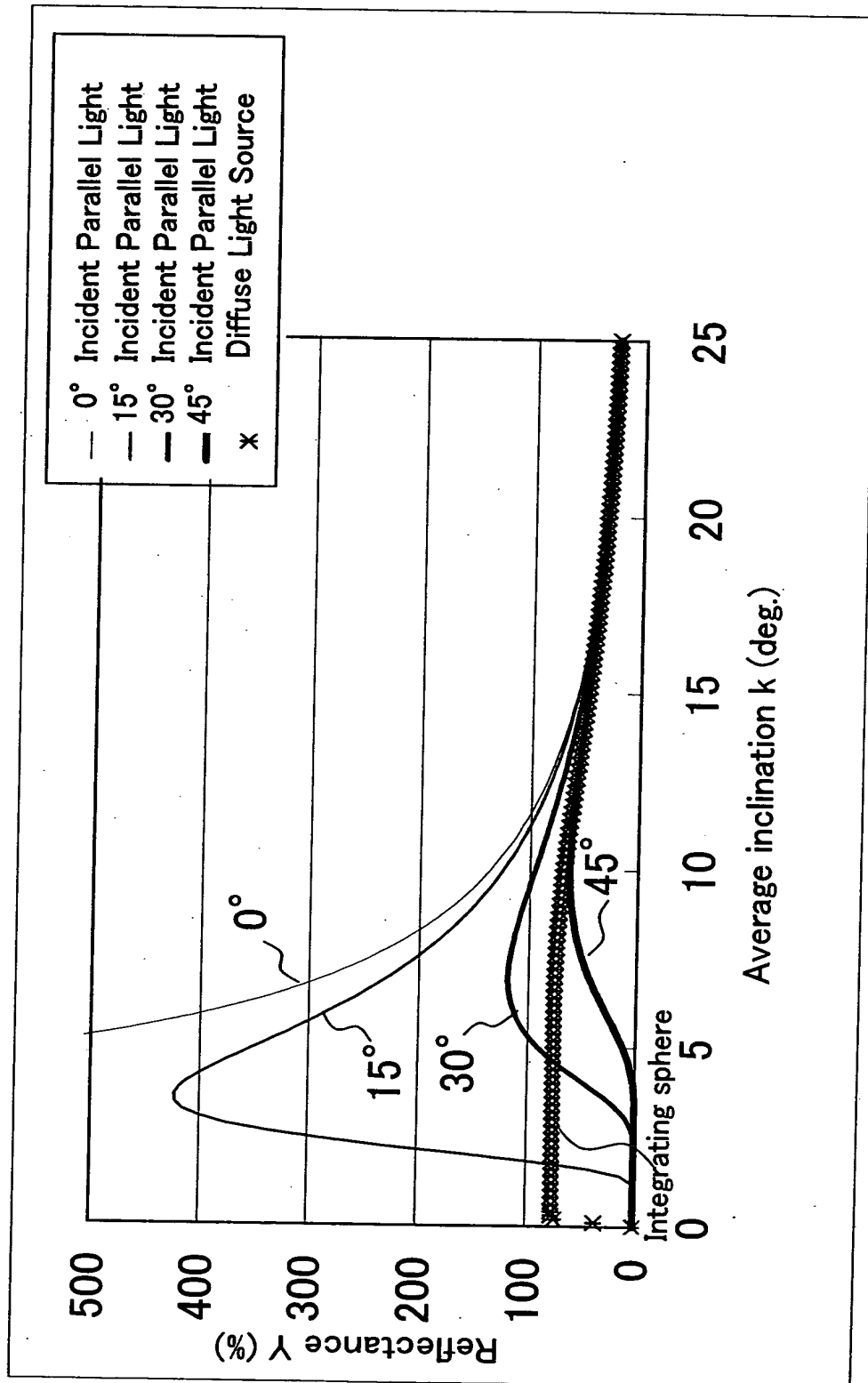


FIG. 10

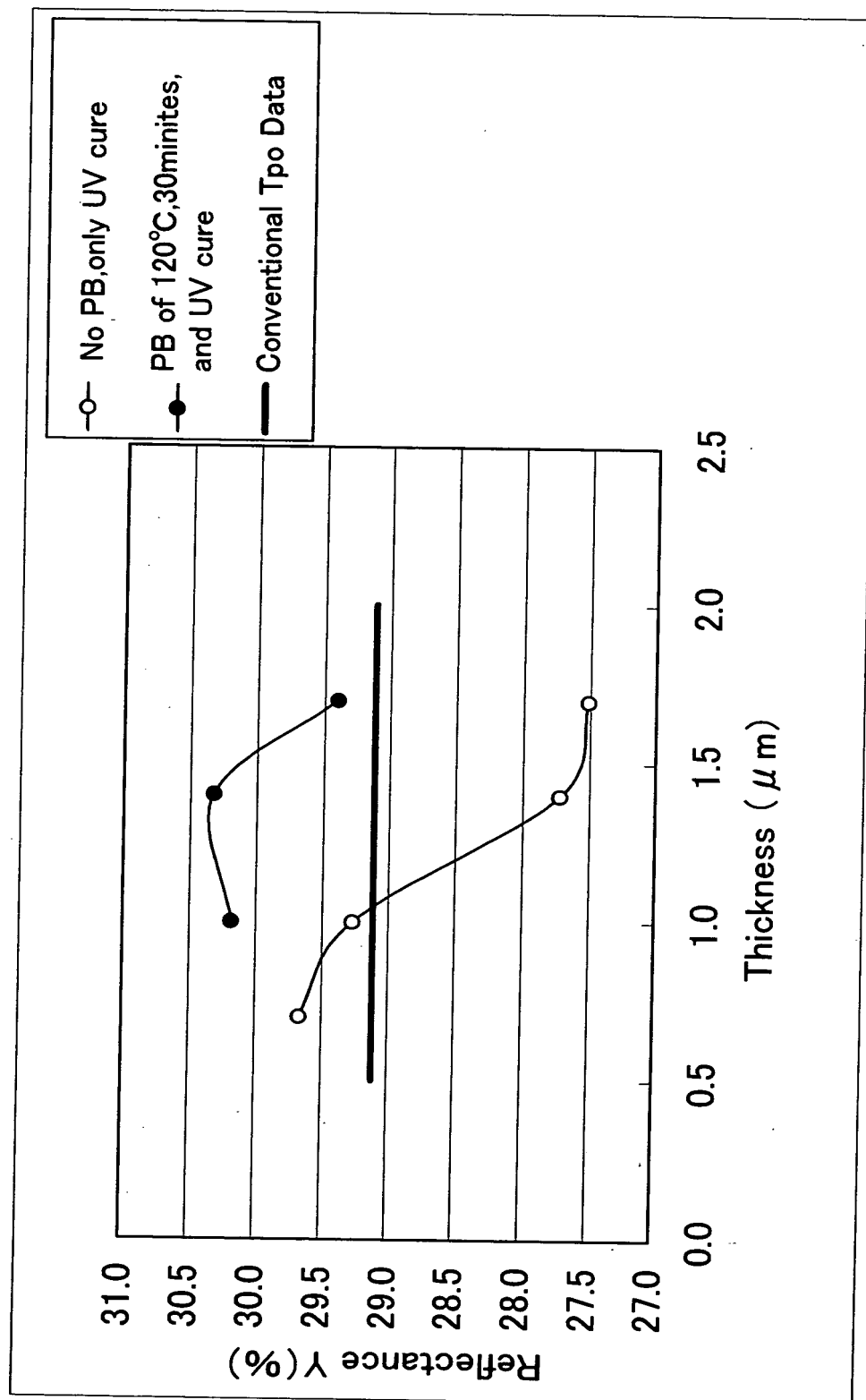




FIG. 11A

Rough undulation

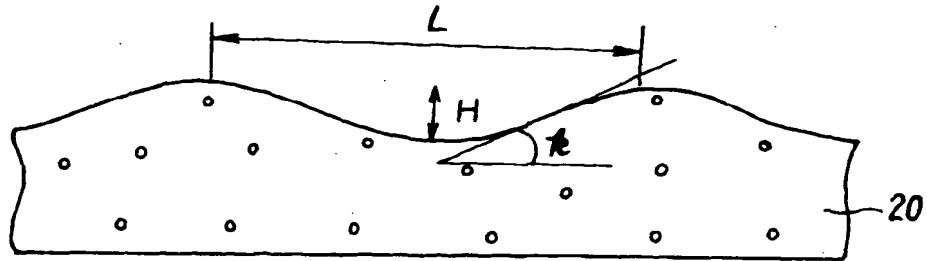


FIG. 11B

Fine undulation

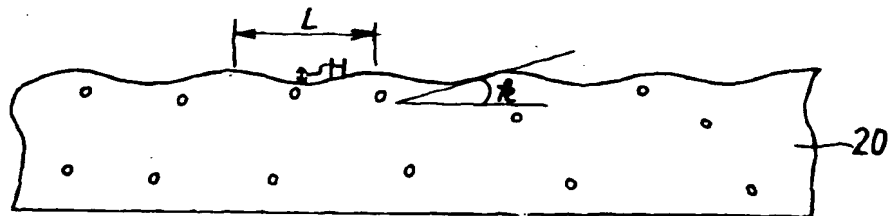


FIG. 12A



FIG. 12B

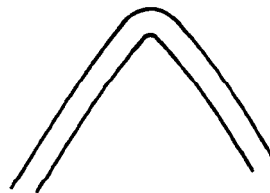


FIG. 12C

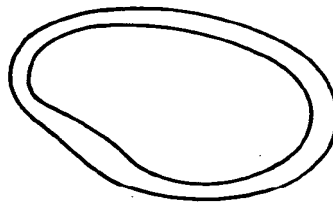


FIG. 12D

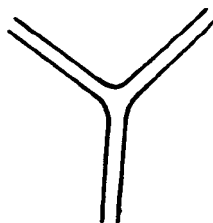


FIG. 13A

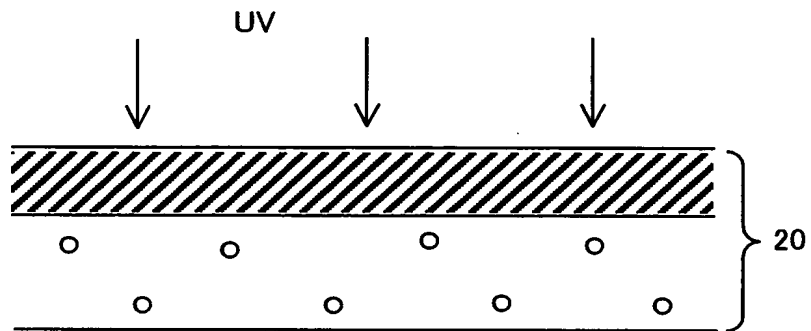
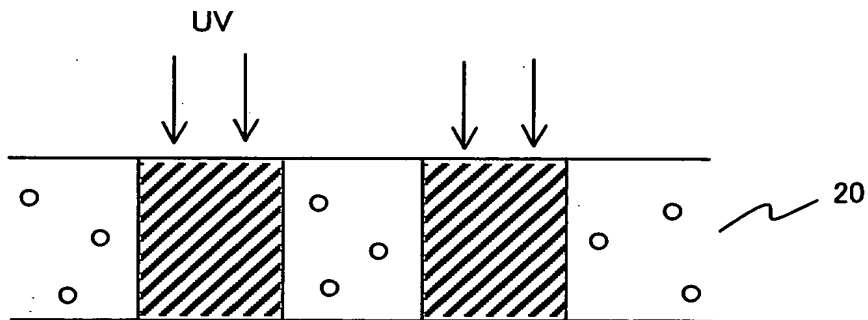


FIG. 13B



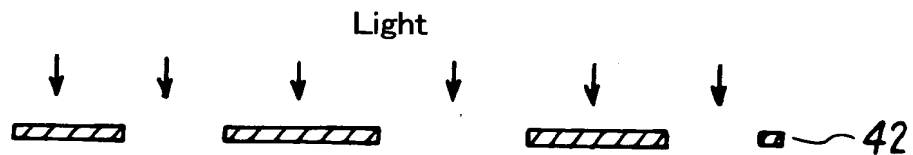


FIG. 14A

Exposure

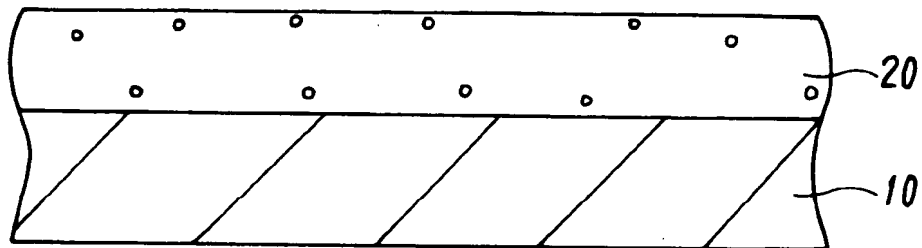


FIG. 14B

Development  
UV irradiation

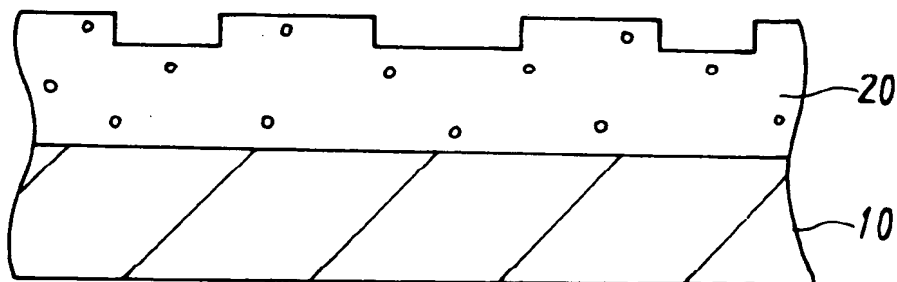


FIG. 14C

Final baking

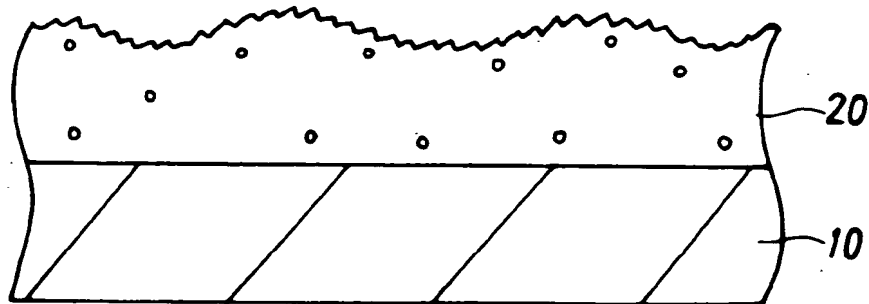


FIG. 15

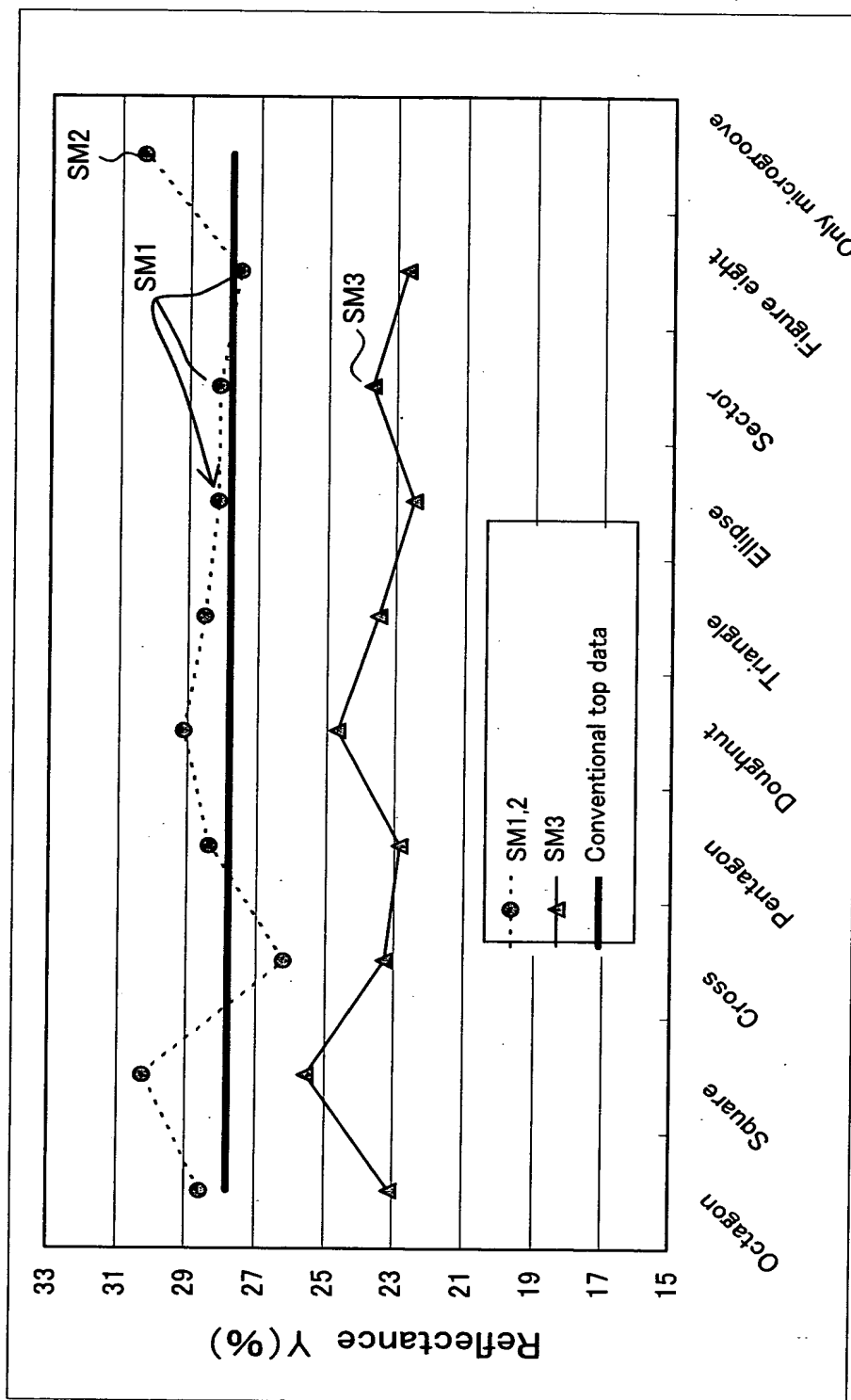


FIG. 16A

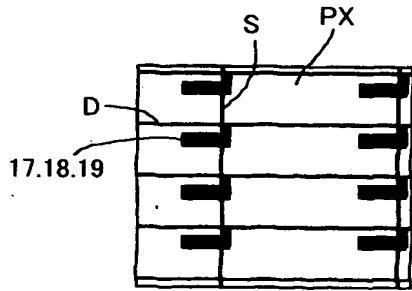


FIG. 16C

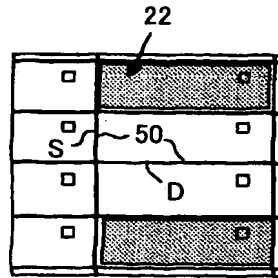


FIG. 16E

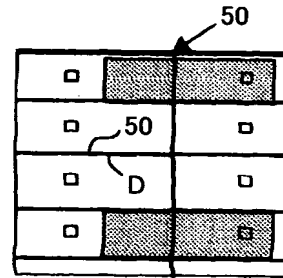


FIG. 16B

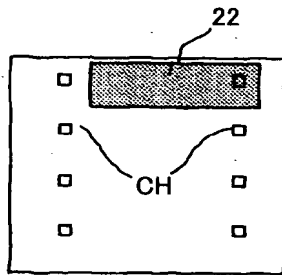


FIG. 16D

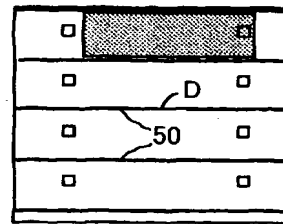
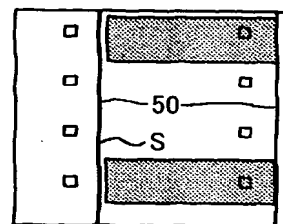


FIG. 16F



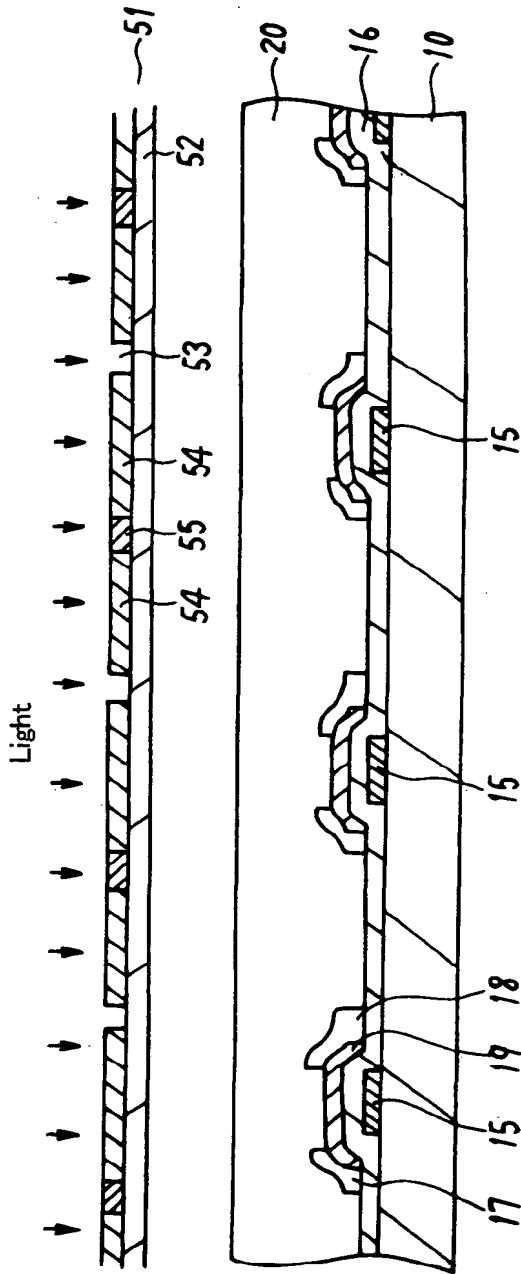


FIG. 17A

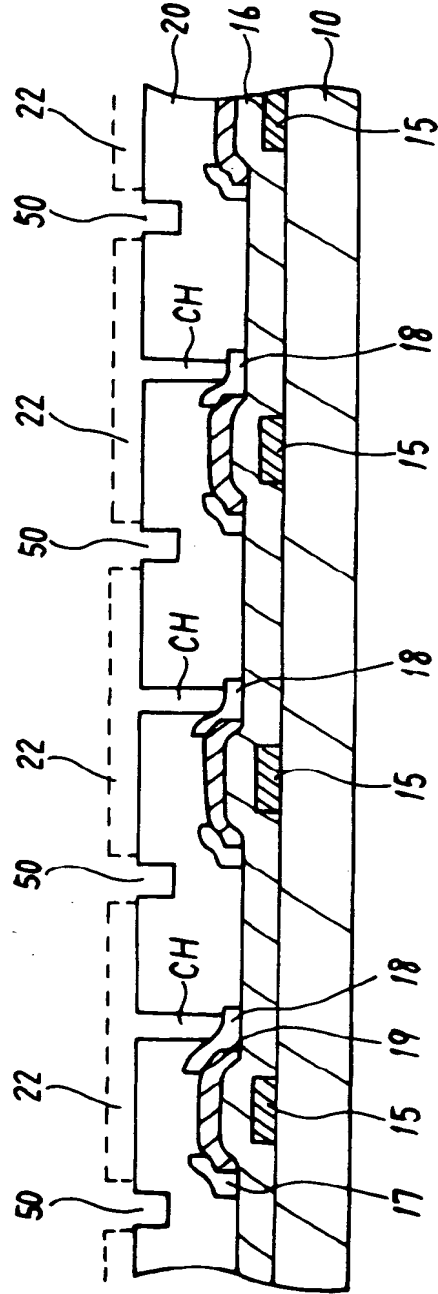
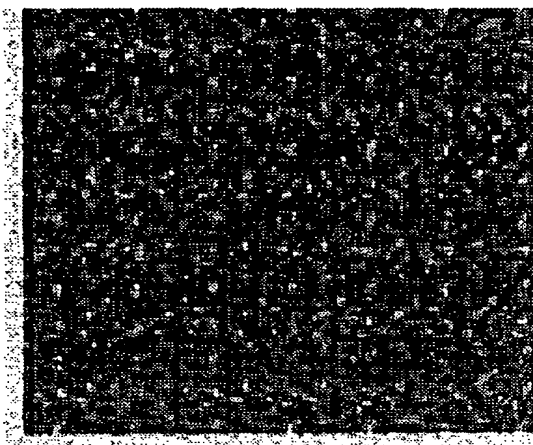


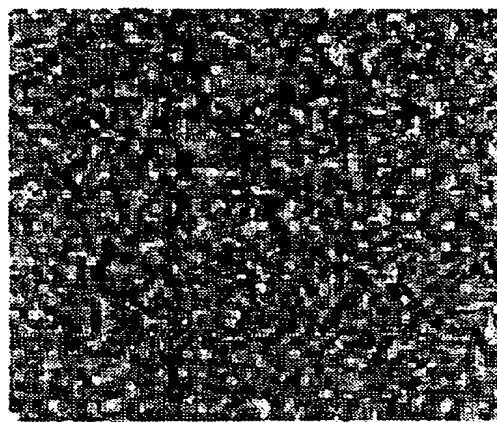
FIG. 17B

FIG. 18A



with separation line

FIG. 18B



without separation line



FIG. 19

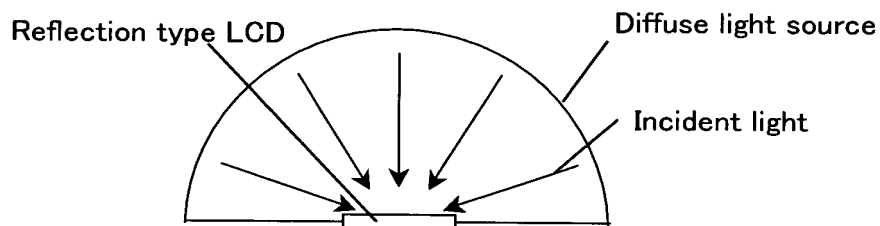


FIG. 20

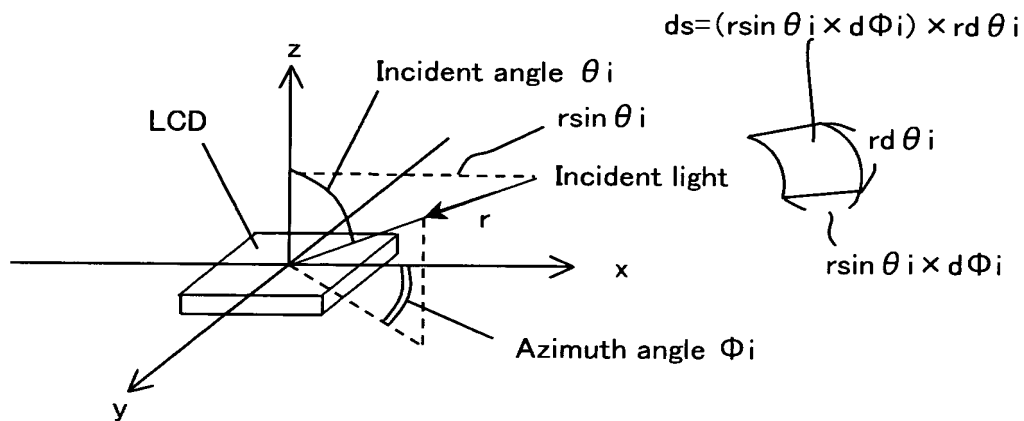


FIG. 21

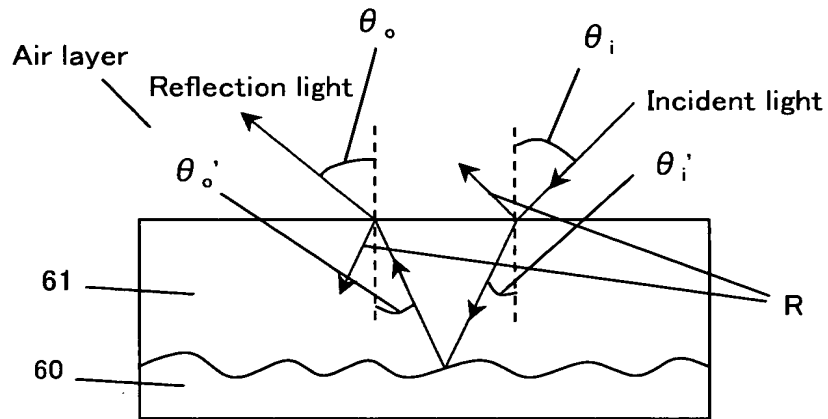


FIG. 22

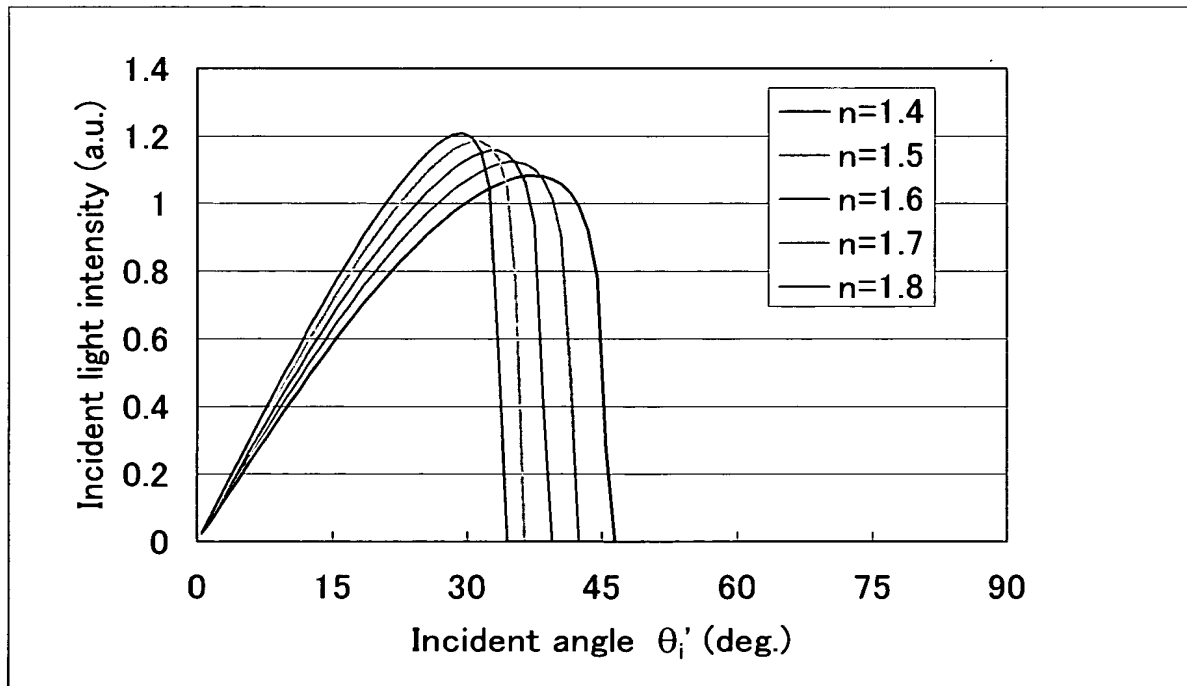


FIG. 23

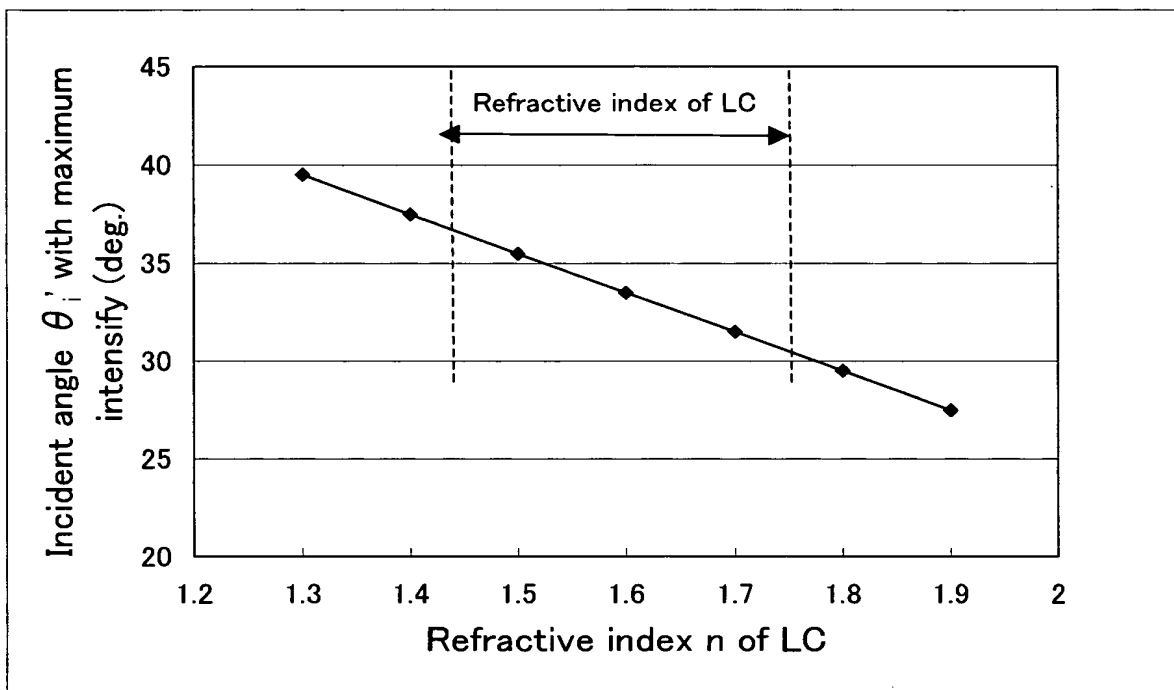


FIG. 24

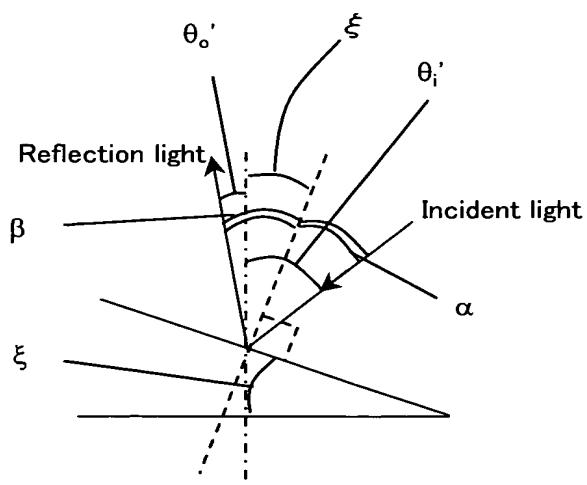


FIG. 25

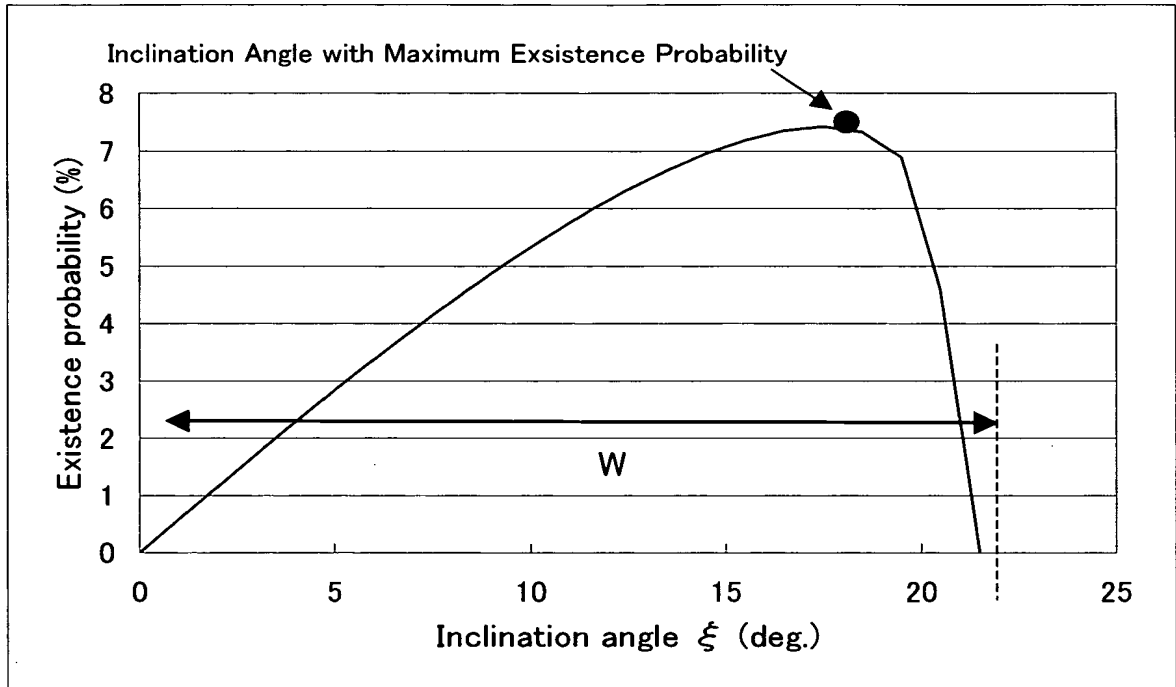


FIG. 26

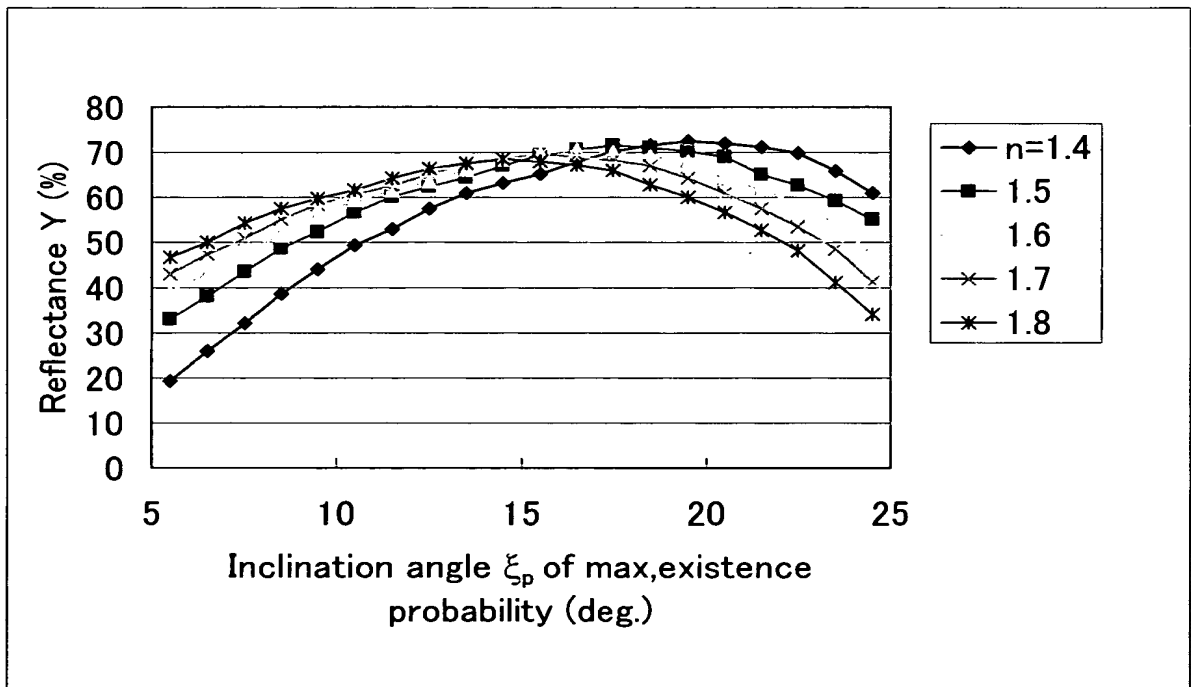
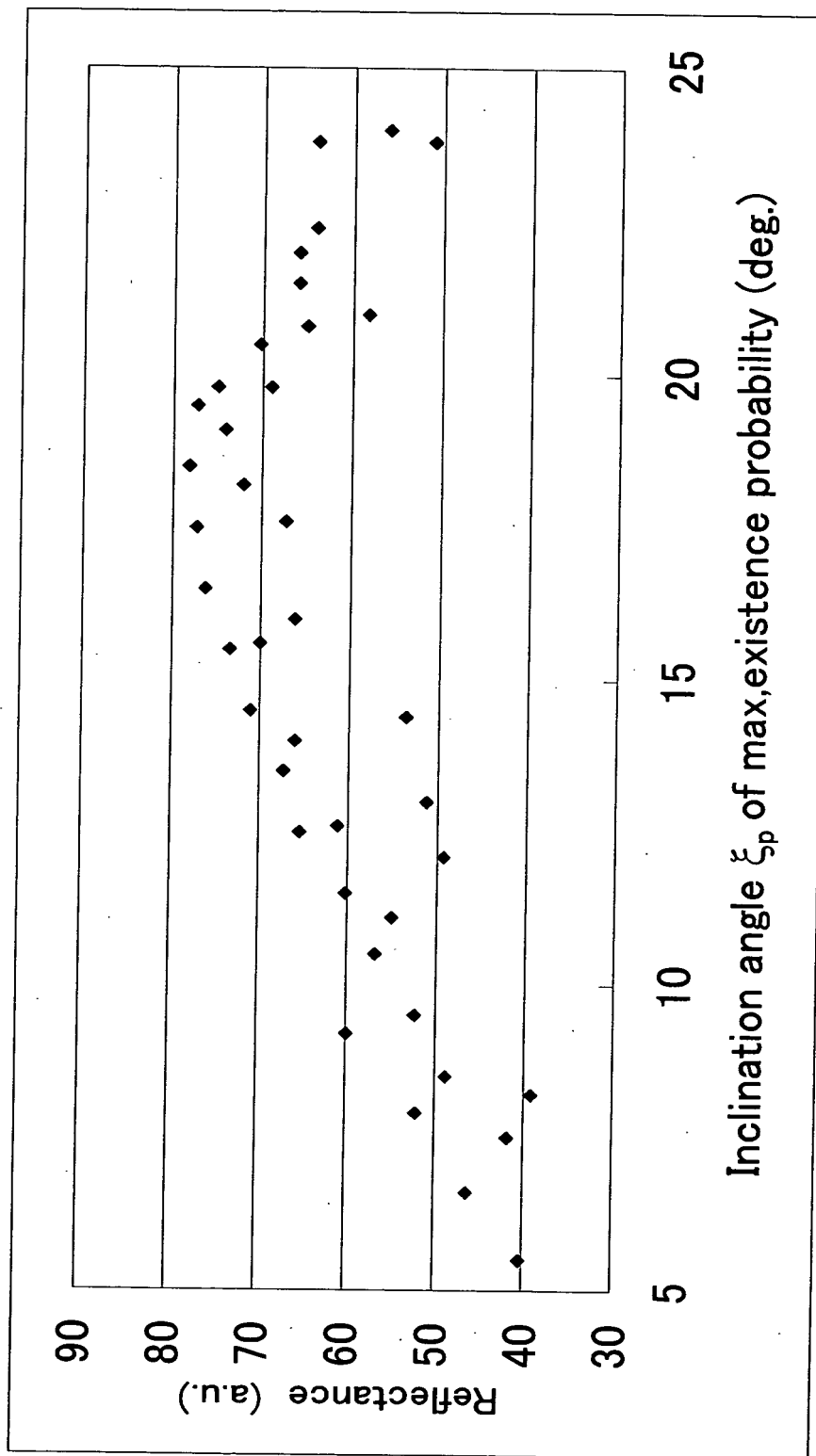


FIG. 27



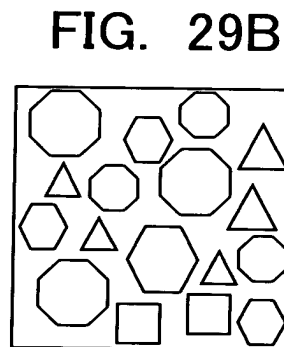
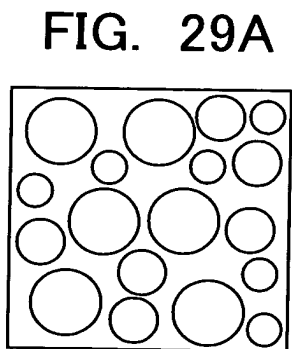
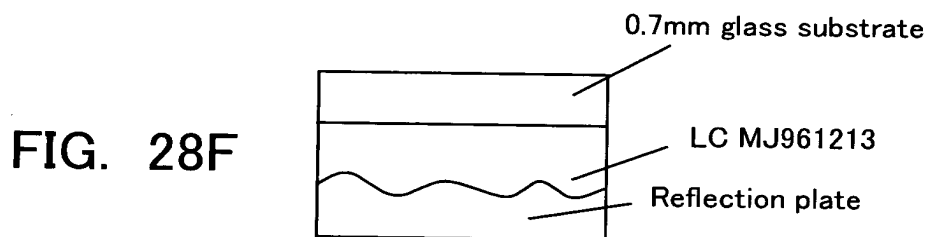
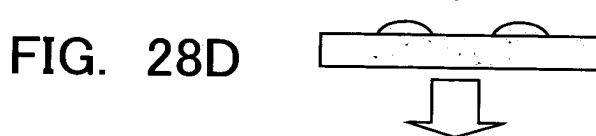
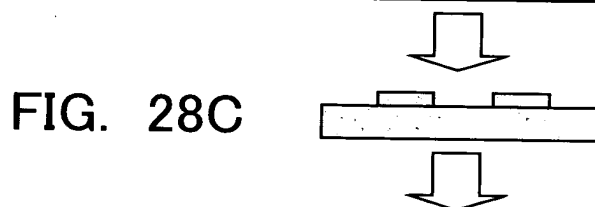
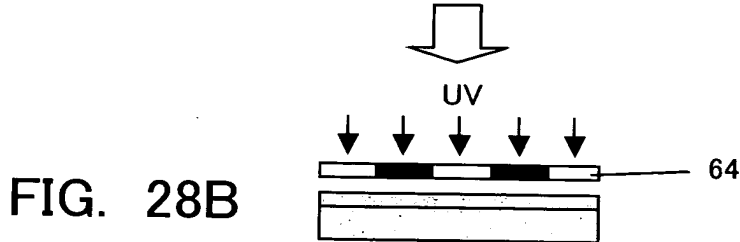


FIG. 30

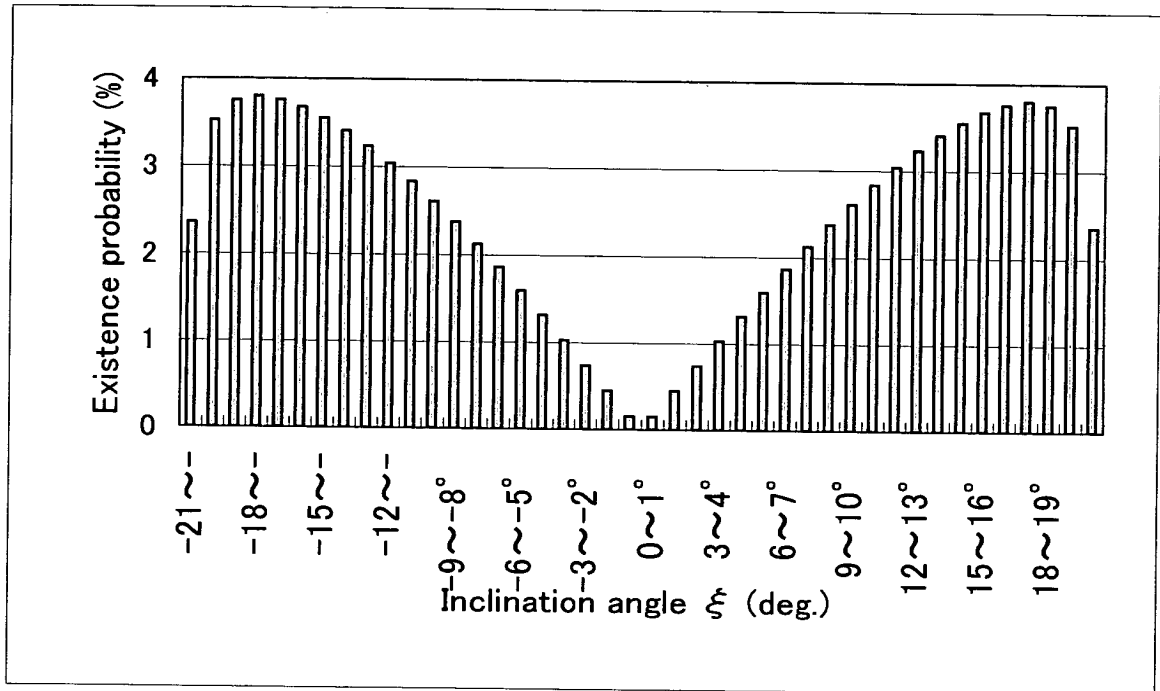


FIG. 31

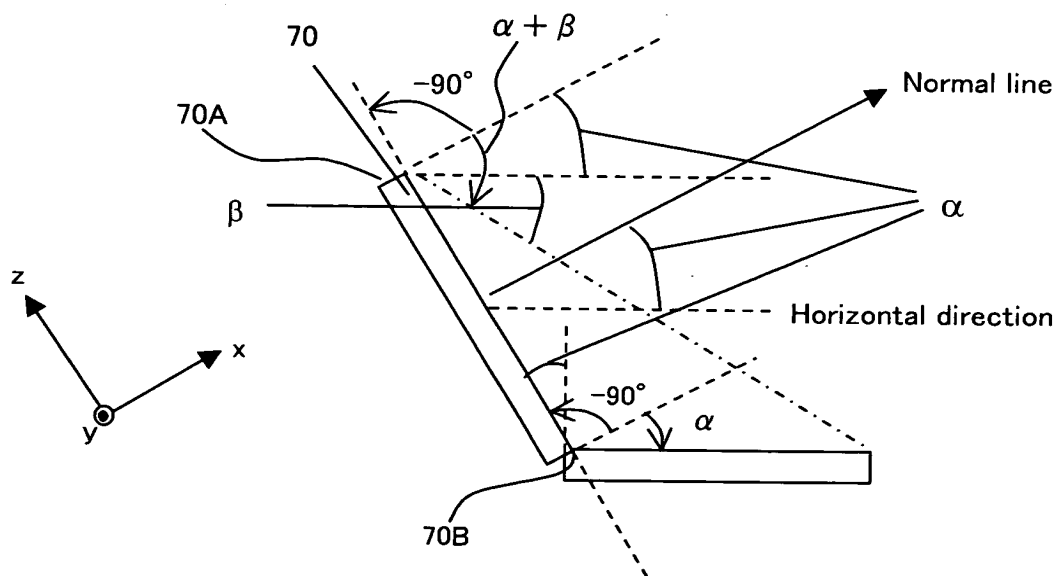


FIG. 32

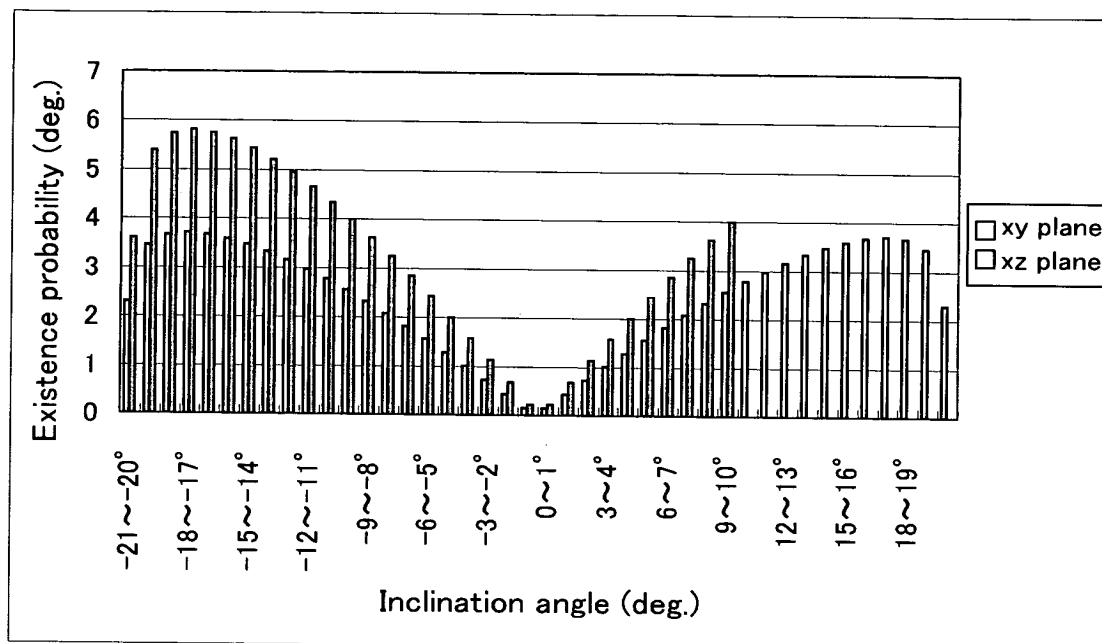
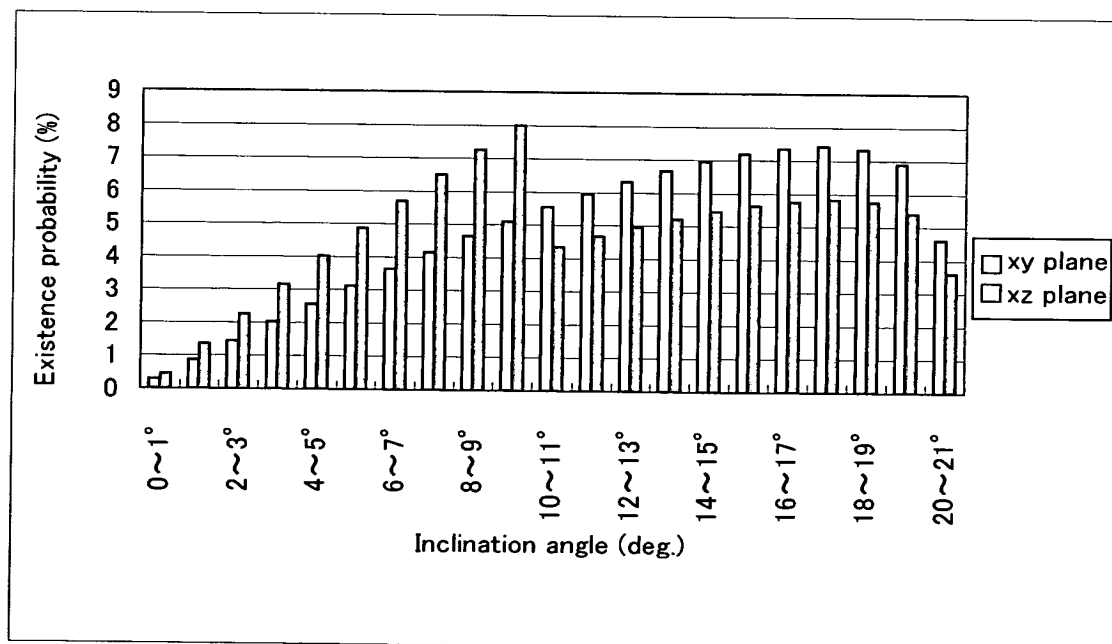


FIG. 33





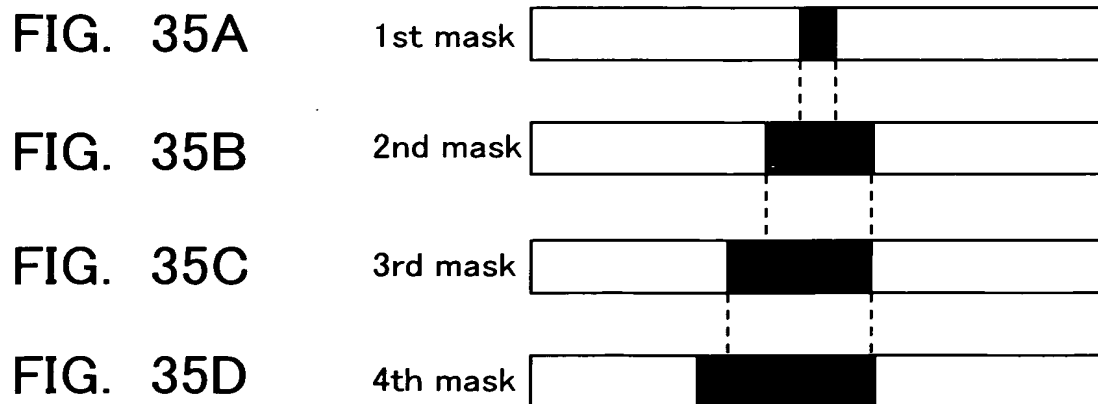
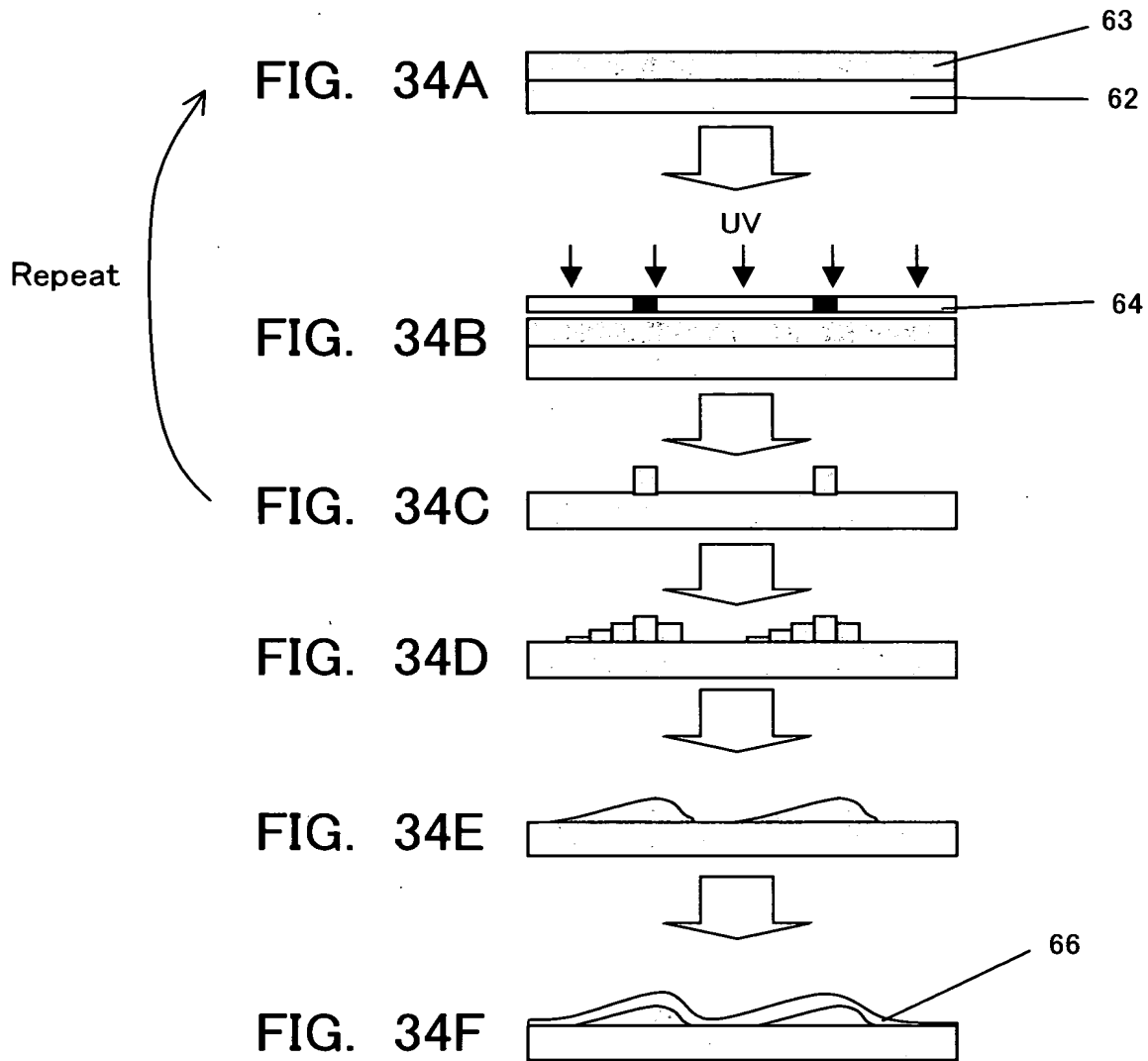


FIG. 36

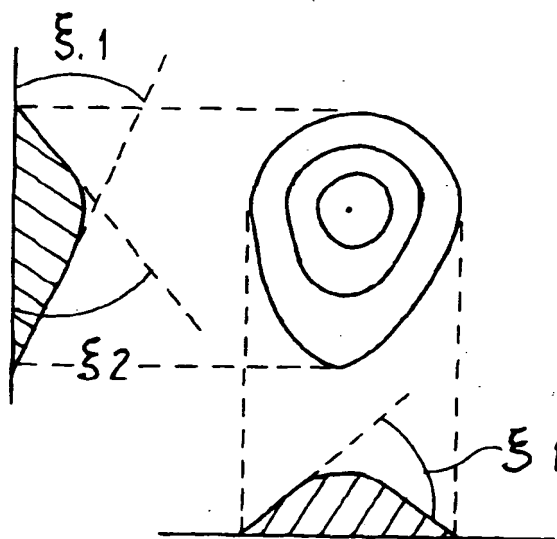


FIG. 37

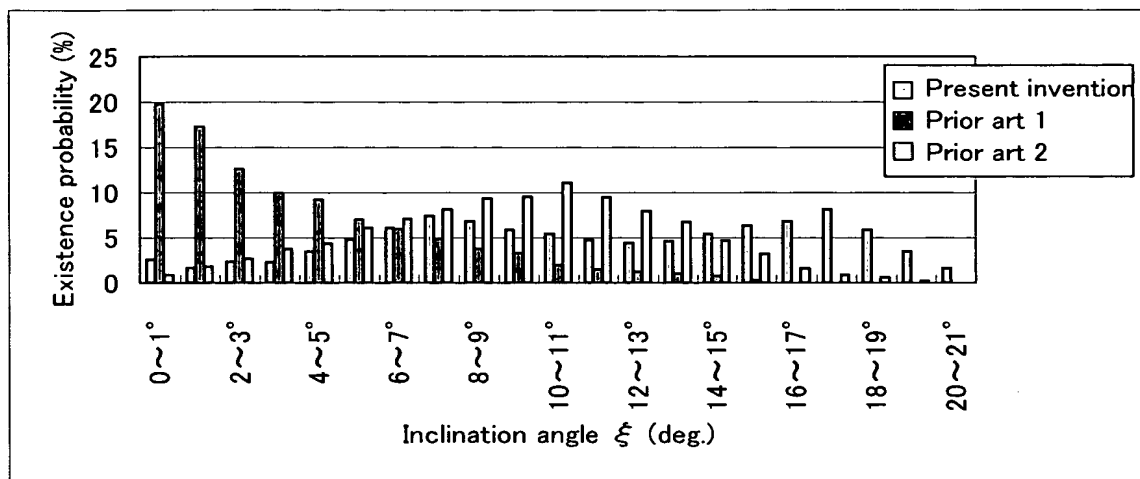


FIG. 38

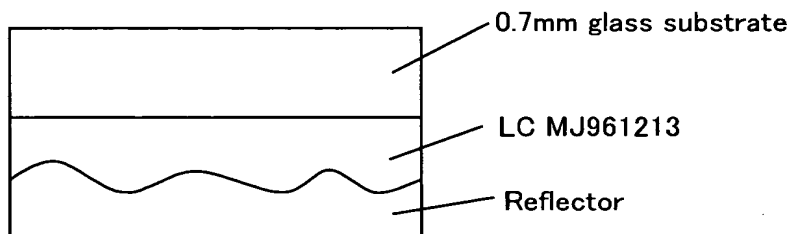


FIG. 39

Measurement result of reflectance

	Present invention	Prior art 1	Prior art 2
Reflectance	61%	31%	53%

Present invention : Existence probability of indication angle is maximum at 8° - 18°  
 Prior art 1 : Existence probability of indication angle is maximum at only 0°  
 Prior art 2 : Existence probability of indication angle is maximum at only 10°

FIG. 40

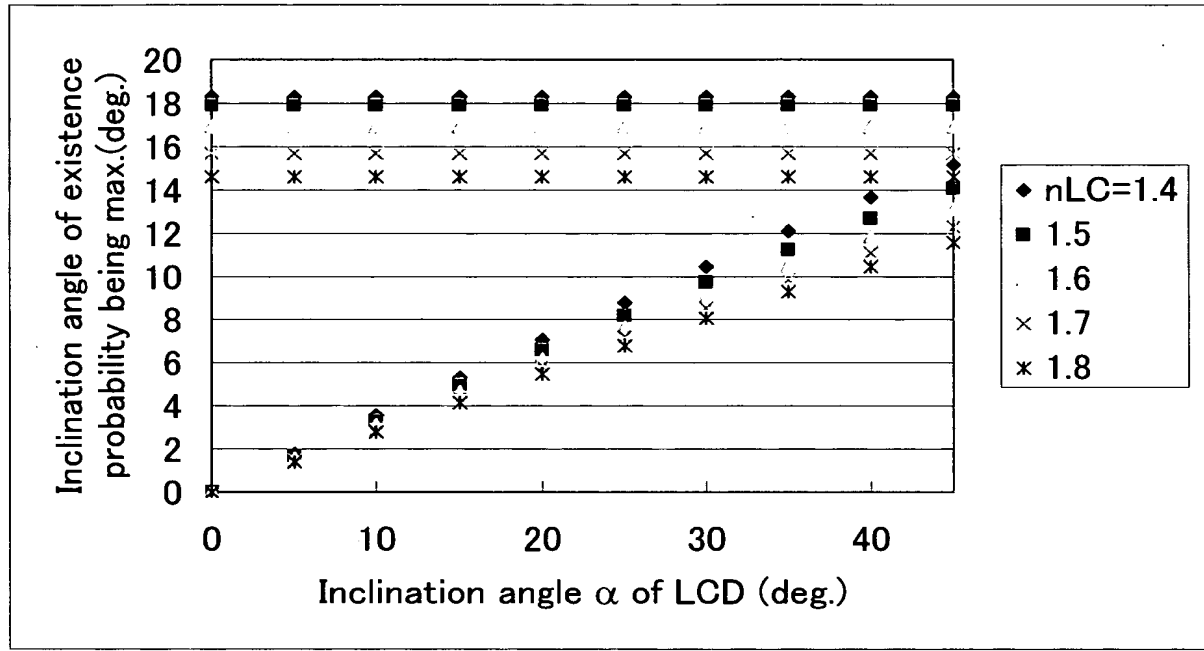


FIG. 41

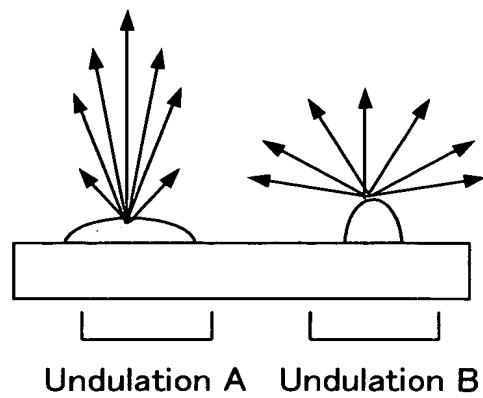


FIG. 42

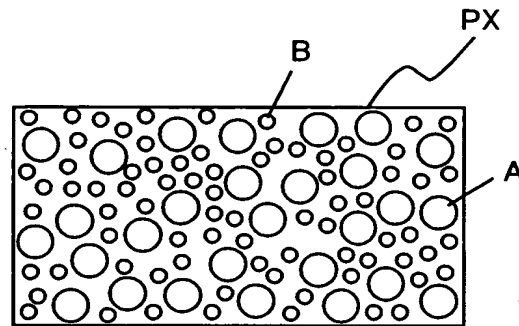


FIG. 43A



FIG. 43B

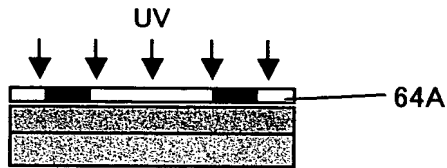


FIG. 43C



FIG. 43D

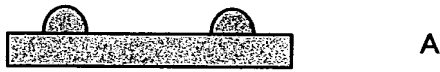


FIG. 43E



FIG. 43F

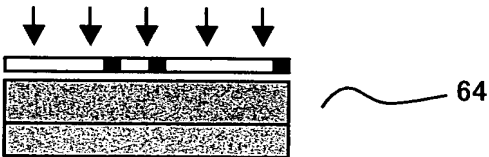


FIG. 43G



FIG. 43H

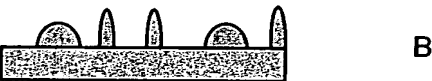
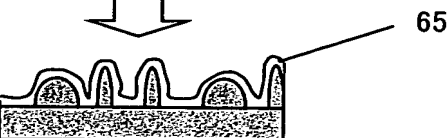
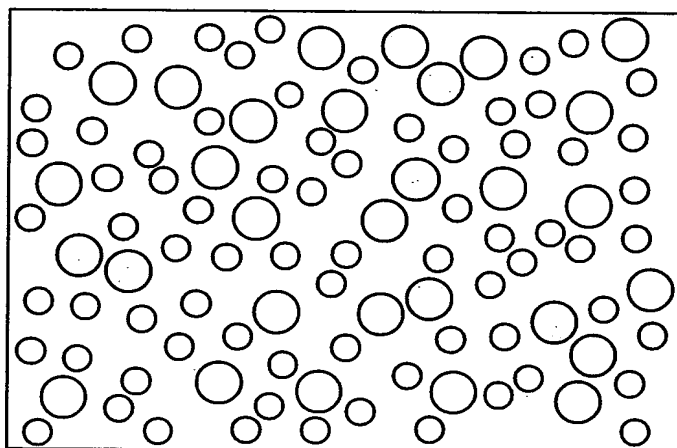


FIG. 43I

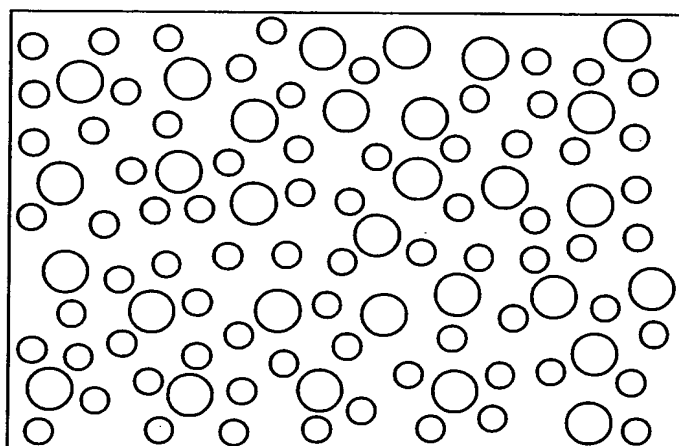


**FIG. 44**



Unite image

**FIG. 45**



Unite image

FIG. 46A

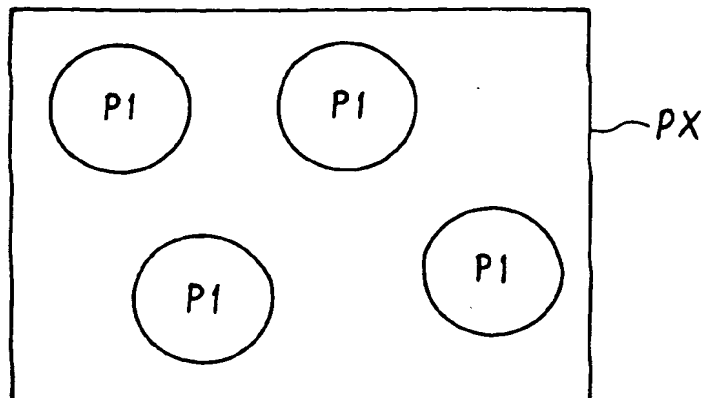


FIG. 46B

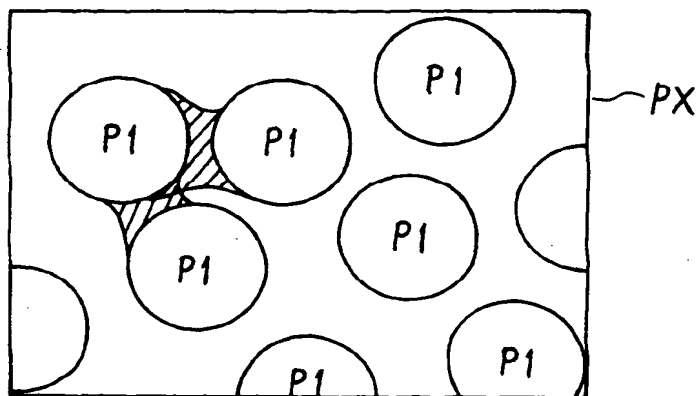


FIG. 46C

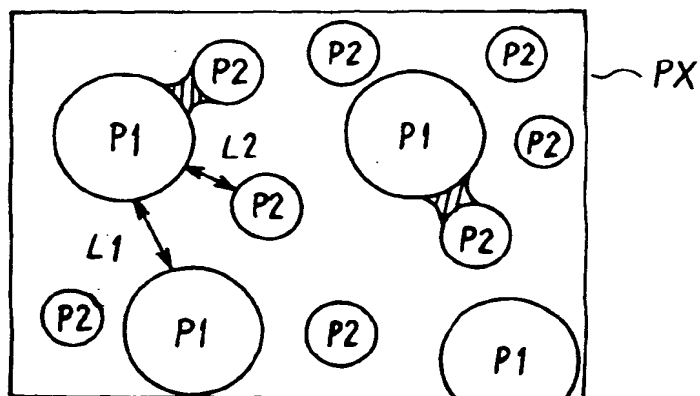




FIG. 47

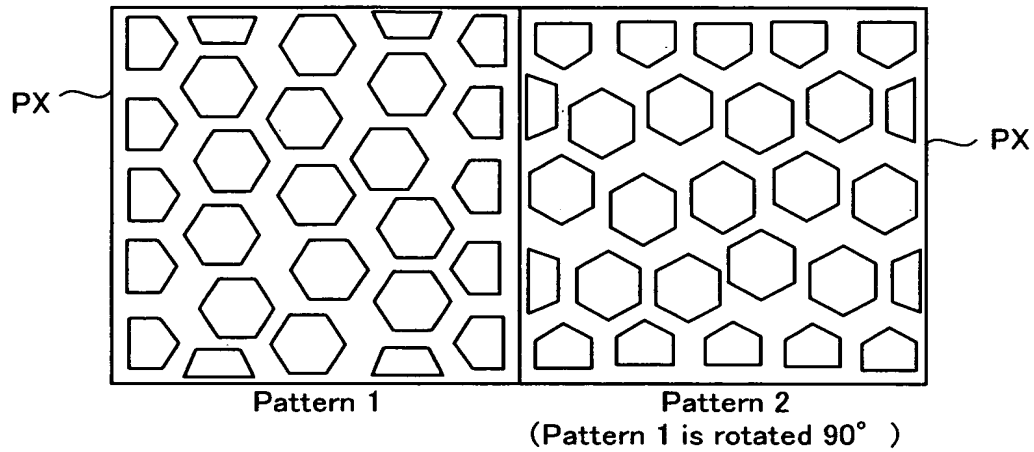


FIG. 48

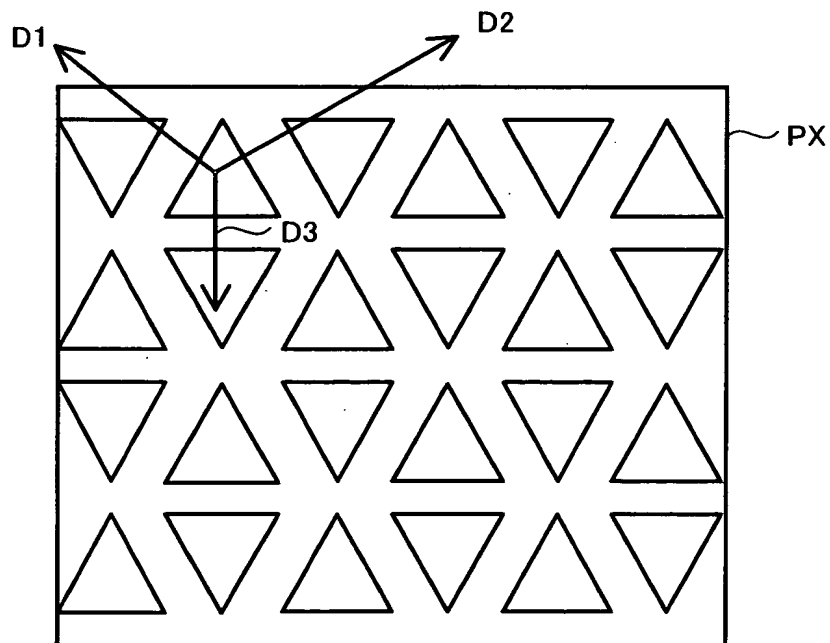
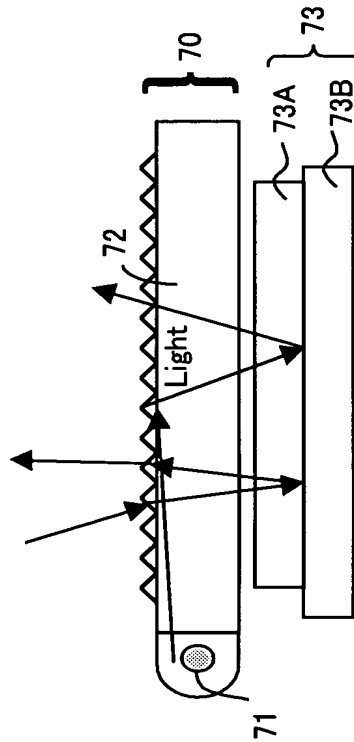


FIG.49

Prior Art



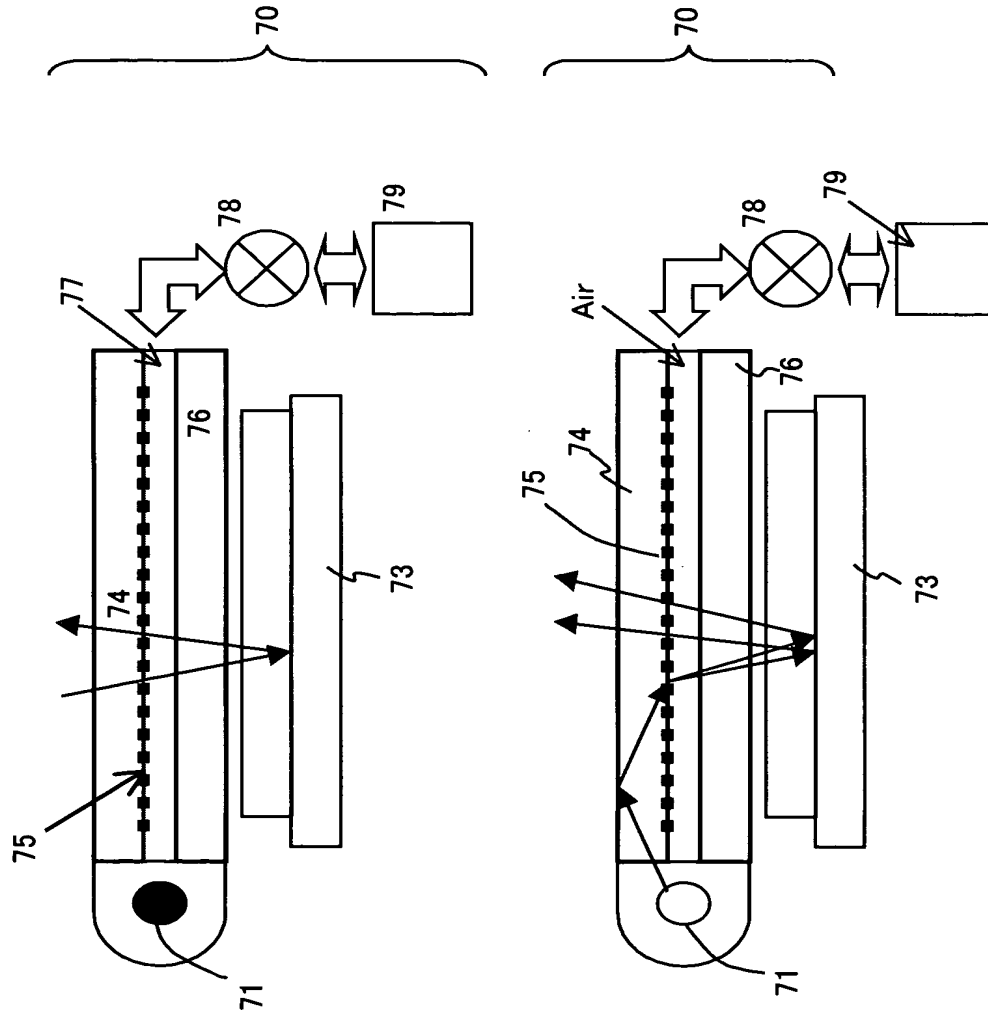
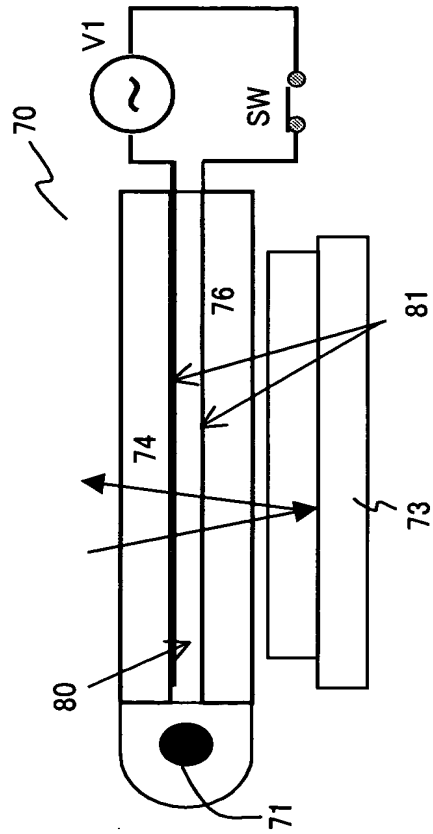


FIG. 50A

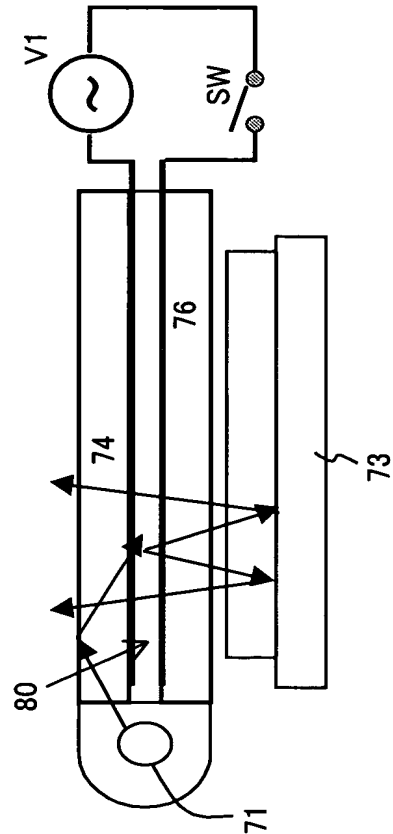
At bright place

FIG. 50B

At dark place



**FIG.51A**  
At bright place



**FIG.51B**  
At dark place

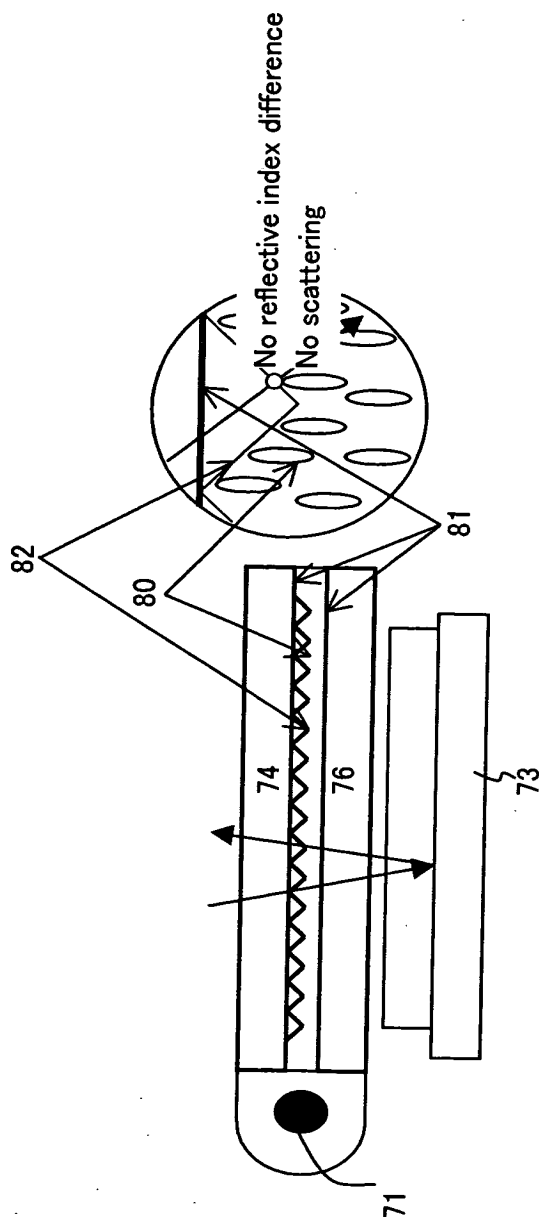


FIG. 52A

At bright place

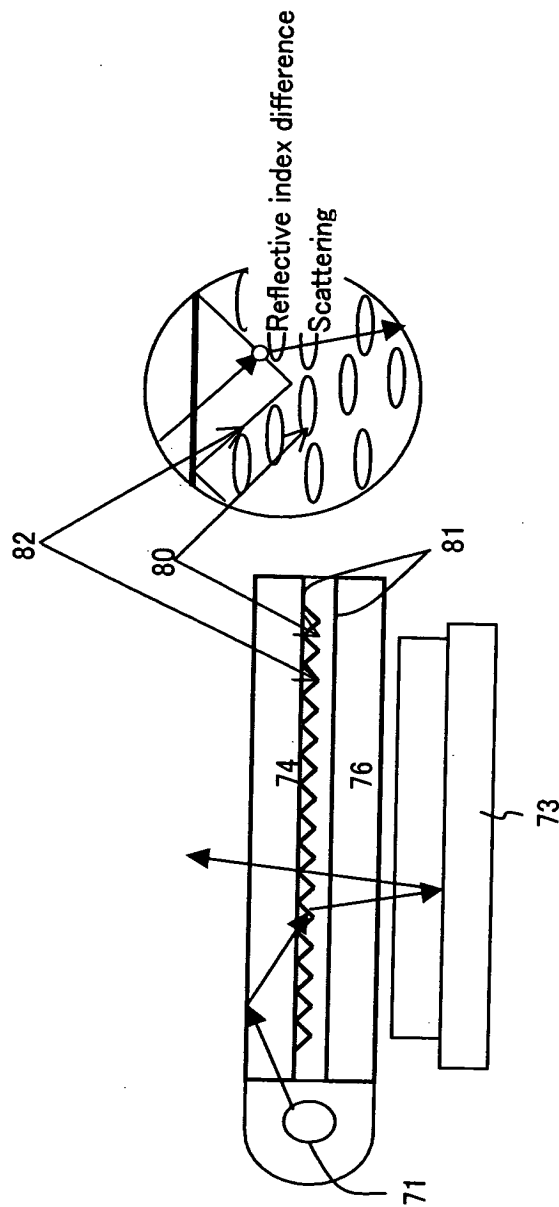


FIG. 52B

At dark place

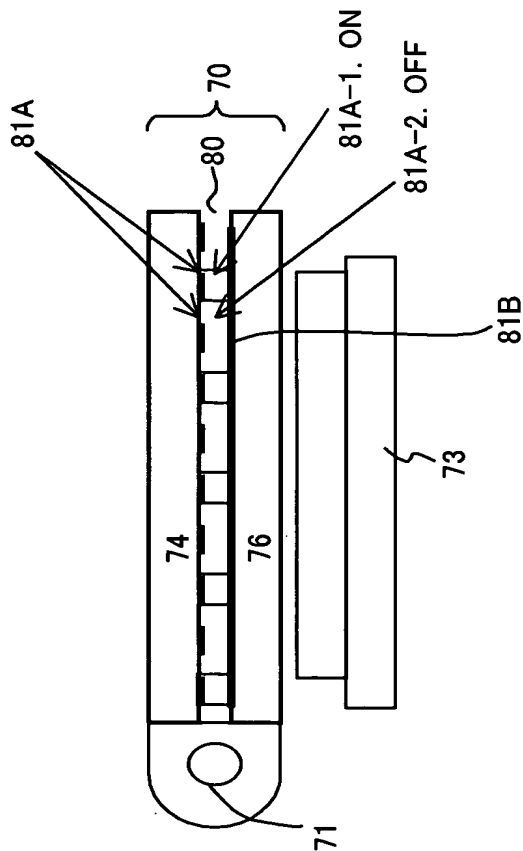


FIG. 53A

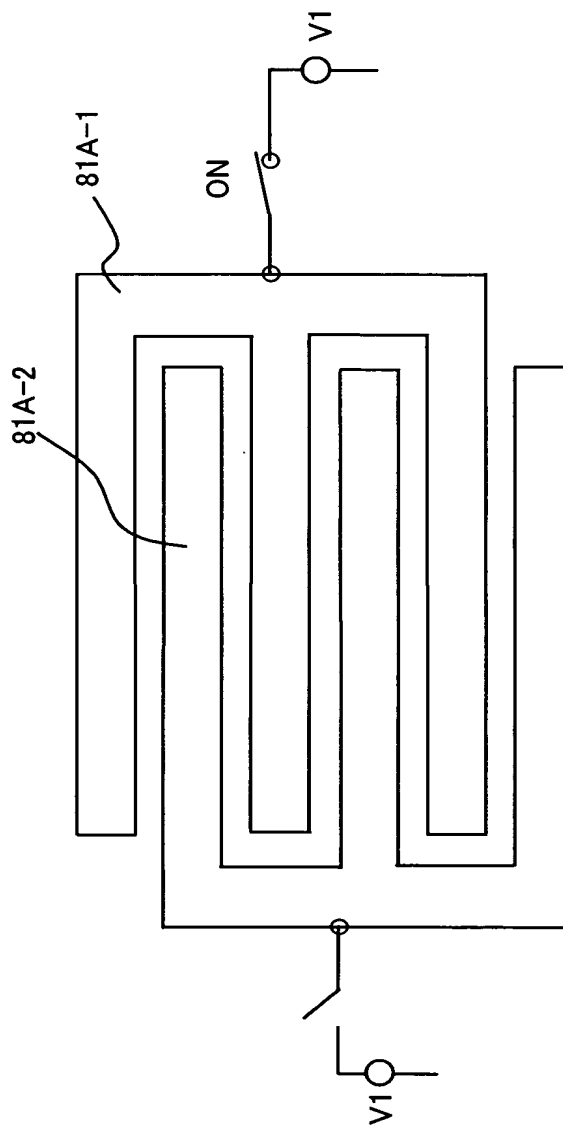
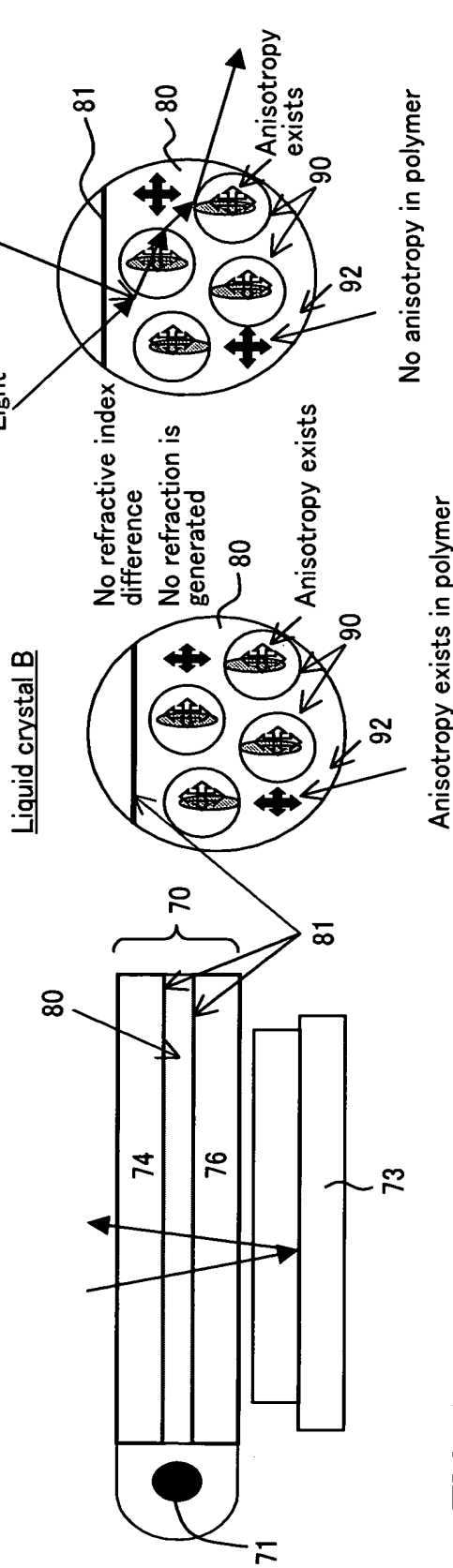


FIG. 53B

Liquid crystal A

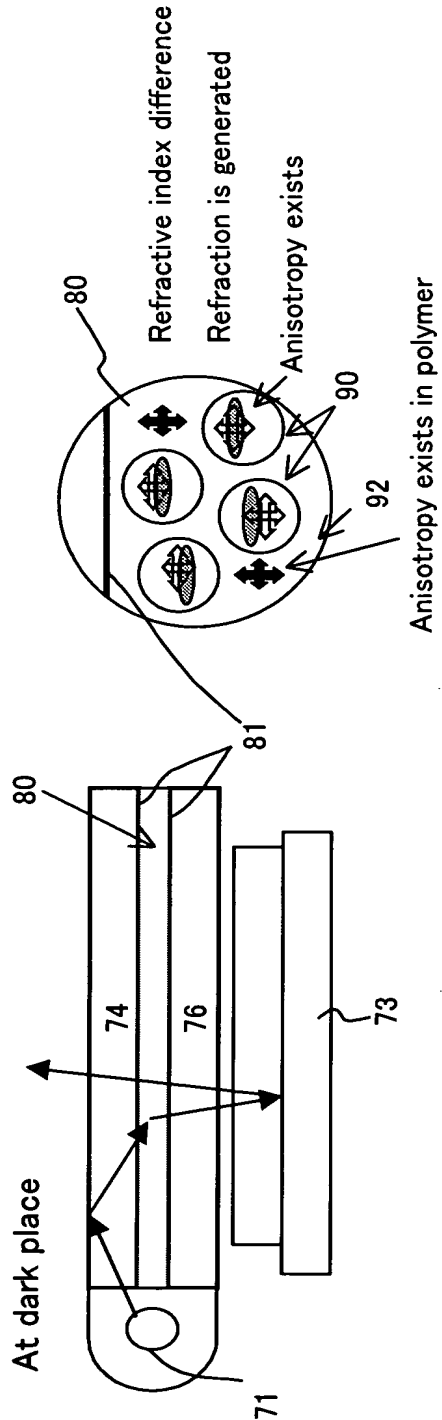
**FIG. 54A**

At bright place



**FIG. 54B**

At dark place



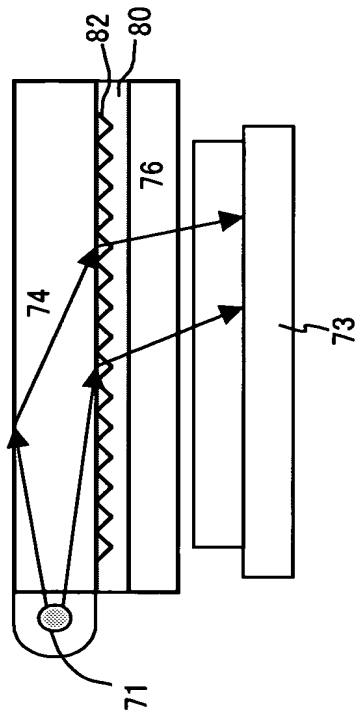


FIG. 55

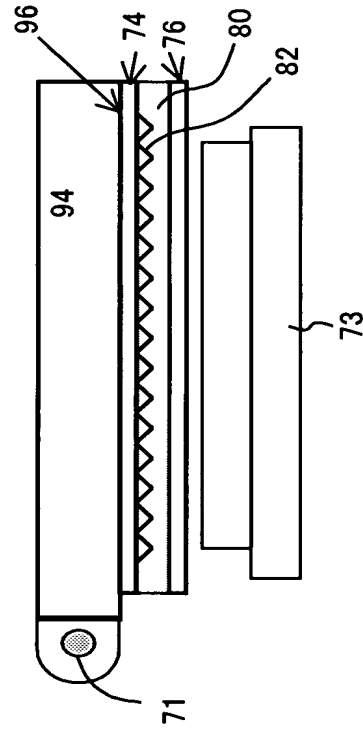


FIG. 56



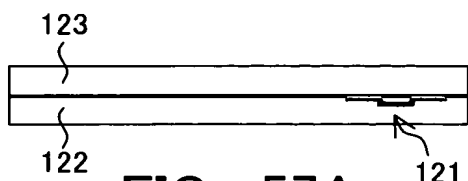


FIG. 57A

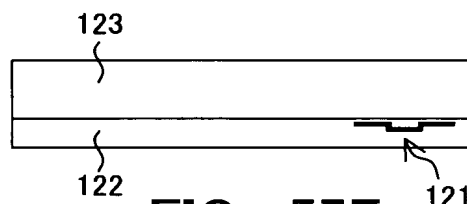


FIG. 57F

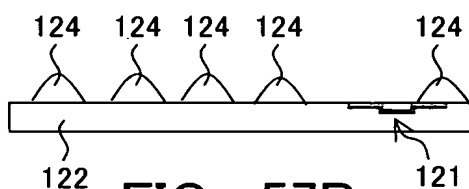


FIG. 57B

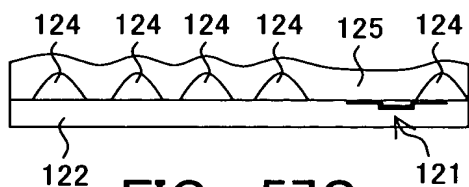


FIG. 57C

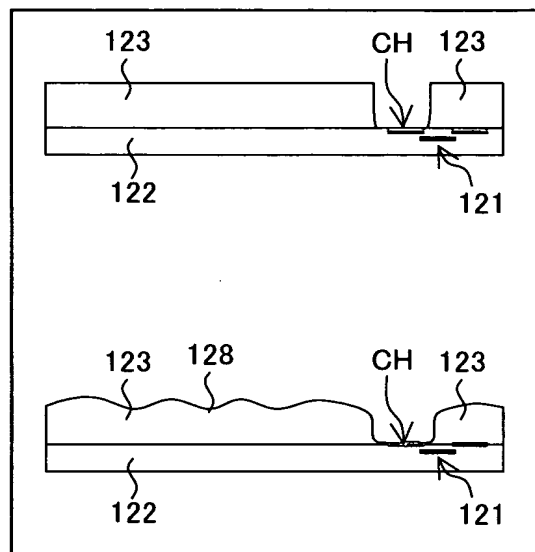


FIG. 57G

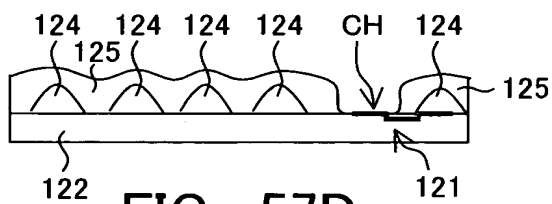


FIG. 57D

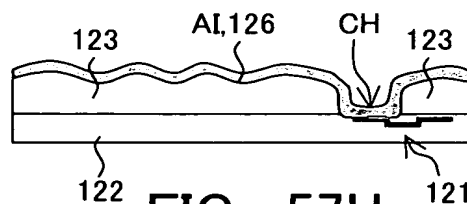


FIG. 57H

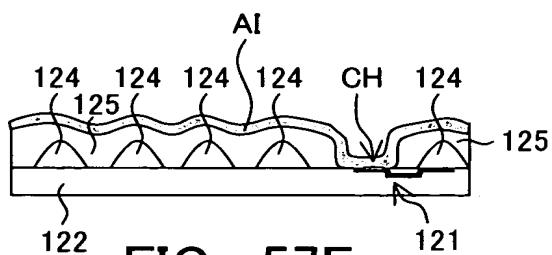


FIG. 57E

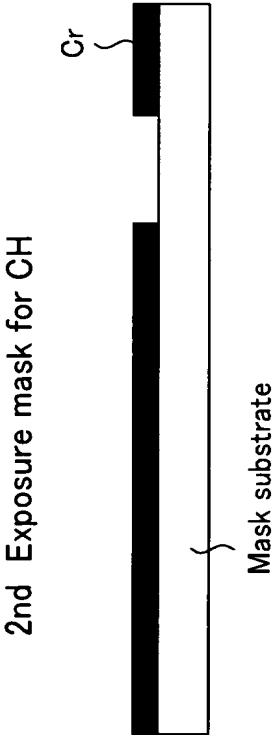
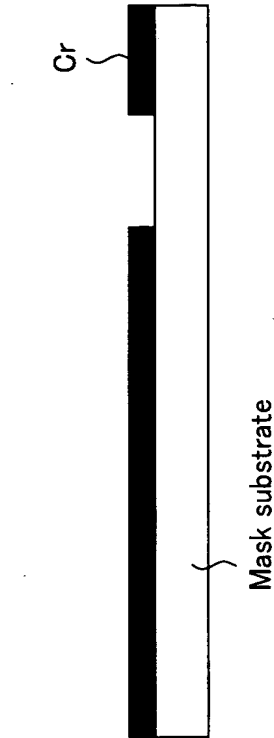


FIG. 58B

FIG. 58A

FIG. 59

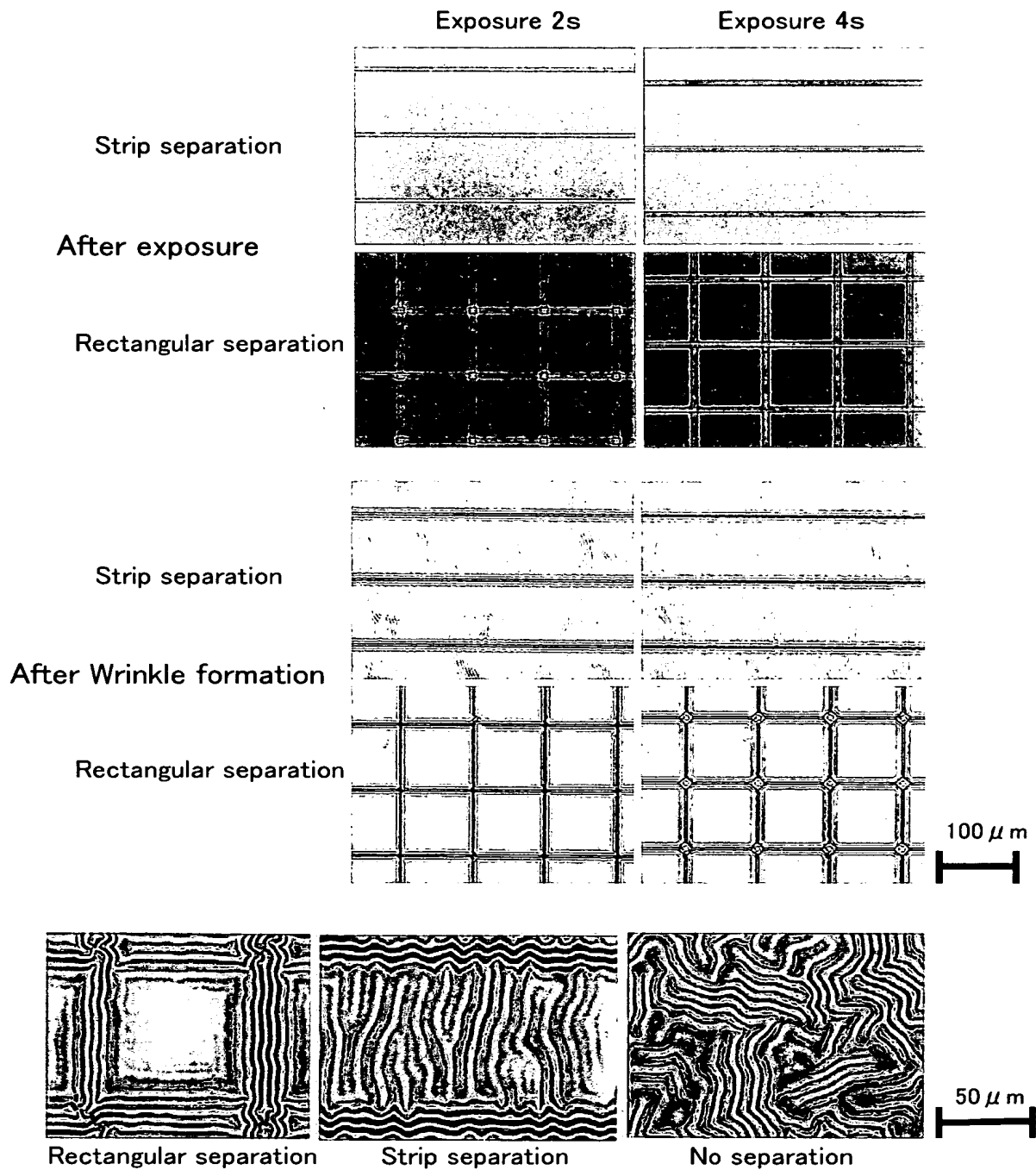


FIG. 60

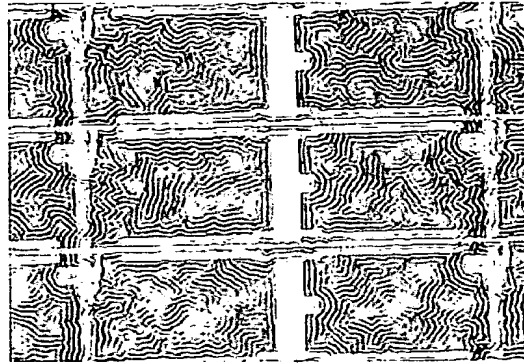
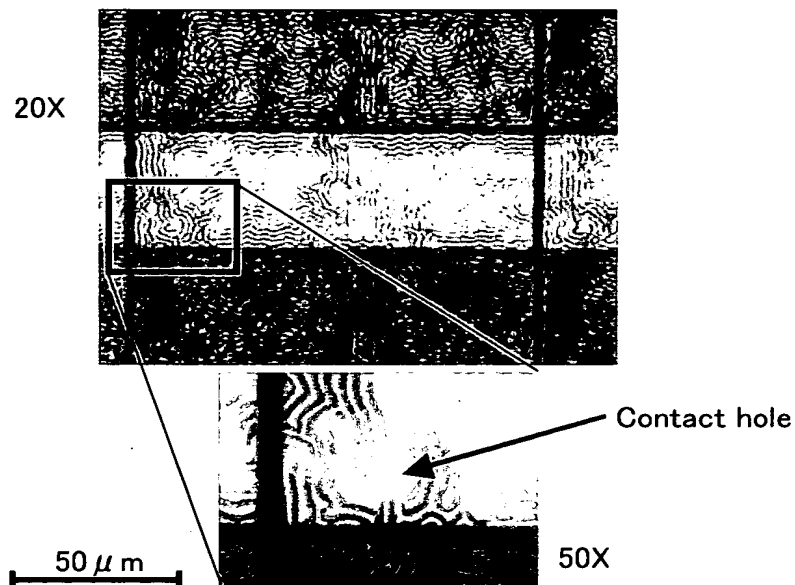


FIG. 61



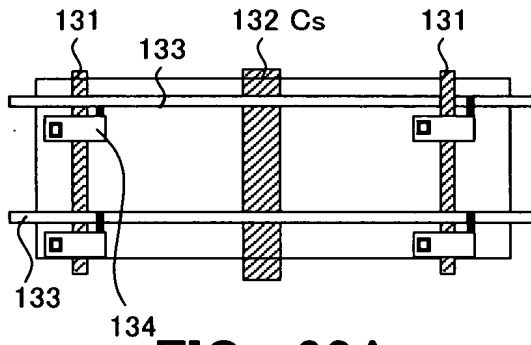


FIG. 62A

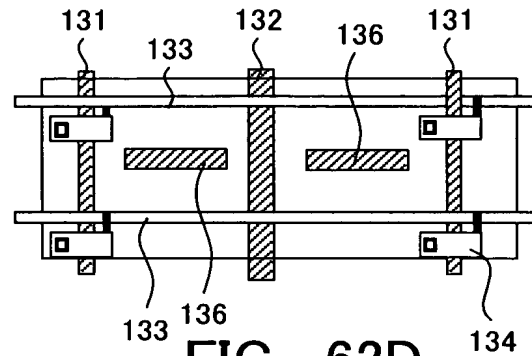


FIG. 62D

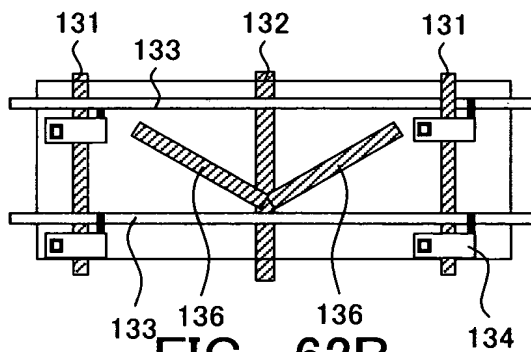


FIG. 62B

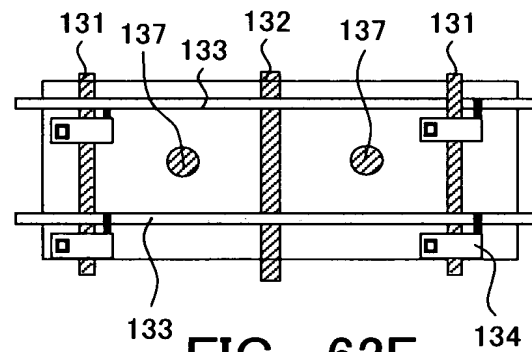


FIG. 62E

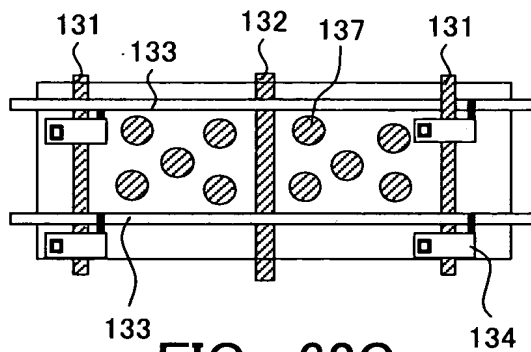


FIG. 62C

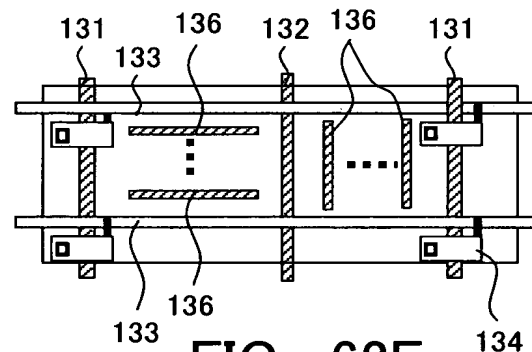


FIG. 62F

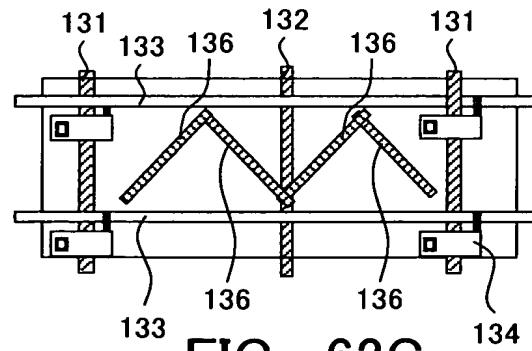


FIG. 62G

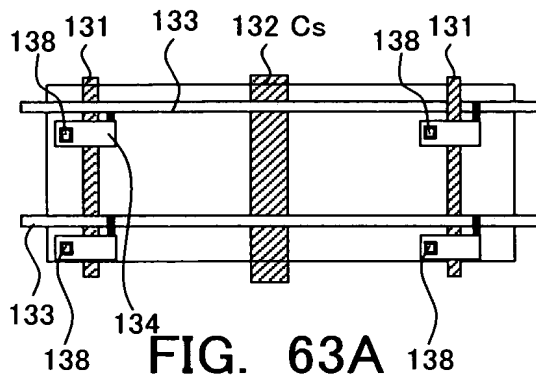


FIG. 63A

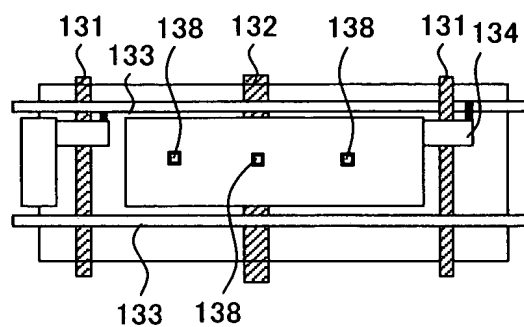


FIG. 63E

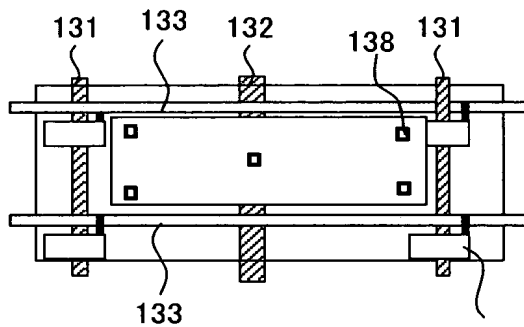


FIG. 63B

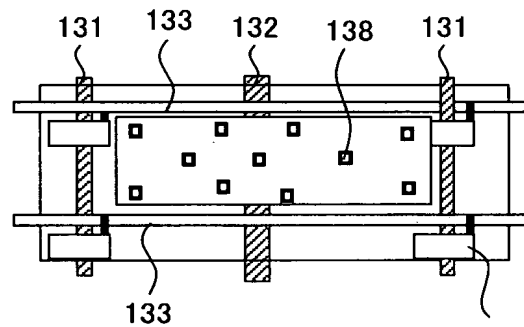


FIG. 63F

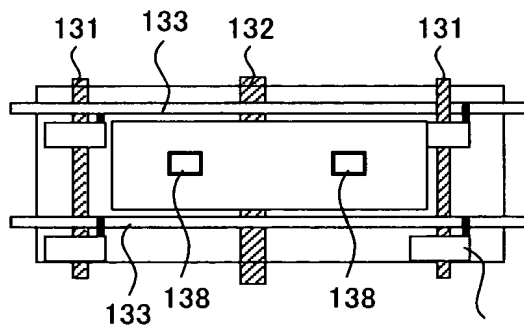


FIG. 63C

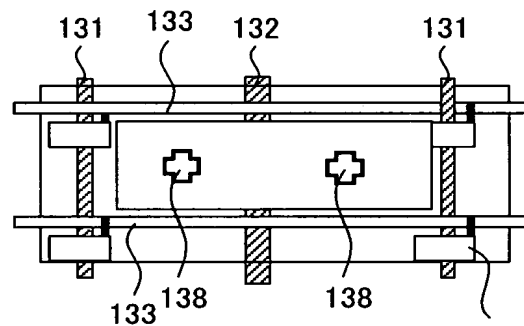


FIG. 63G

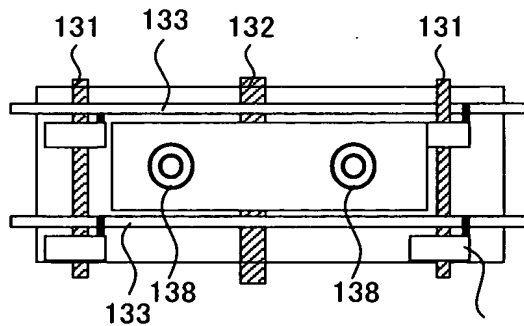


FIG. 63D

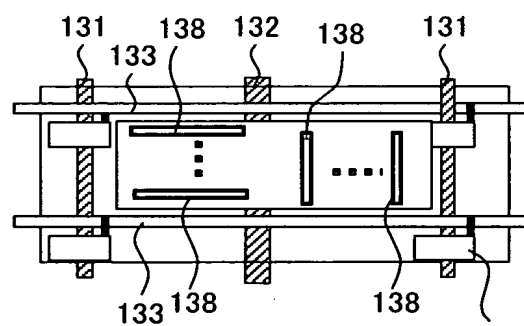


FIG. 63H

FIG. 64

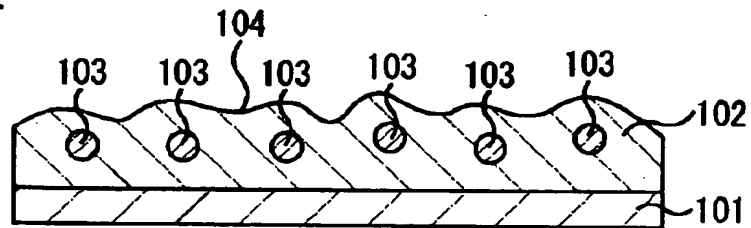


FIG. 65

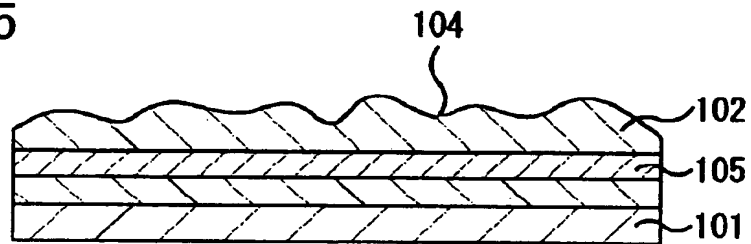


FIG. 66

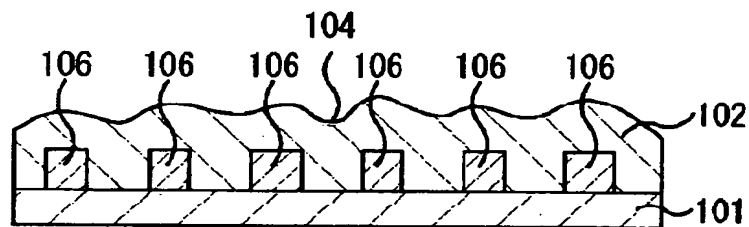


FIG. 67

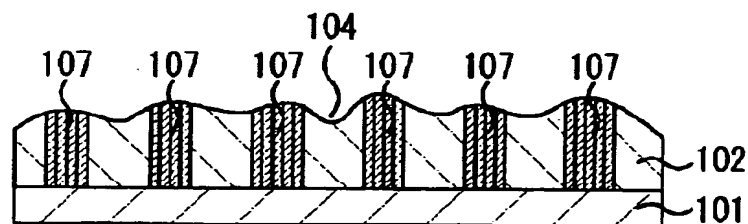


FIG. 68

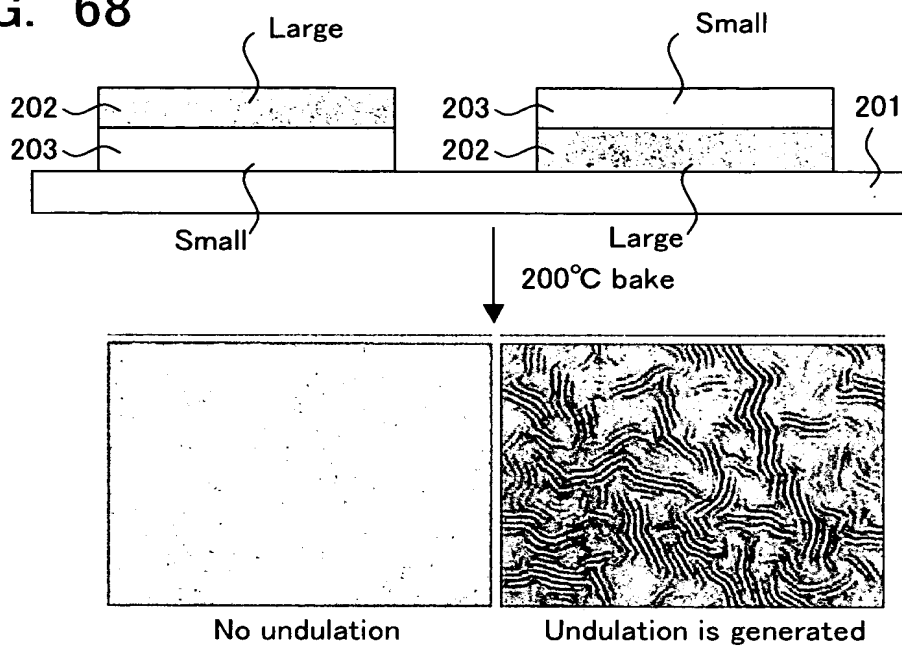


FIG. 69

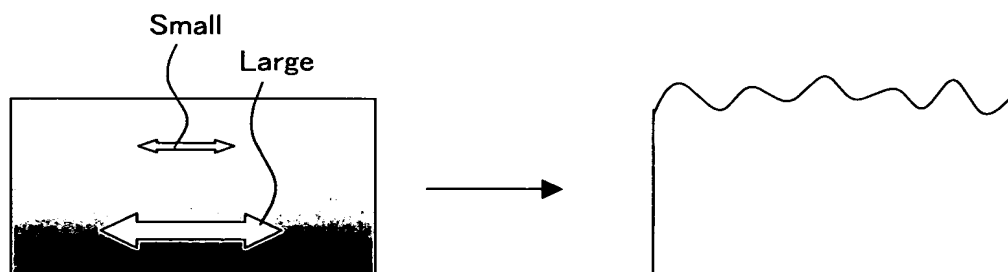


FIG. 70

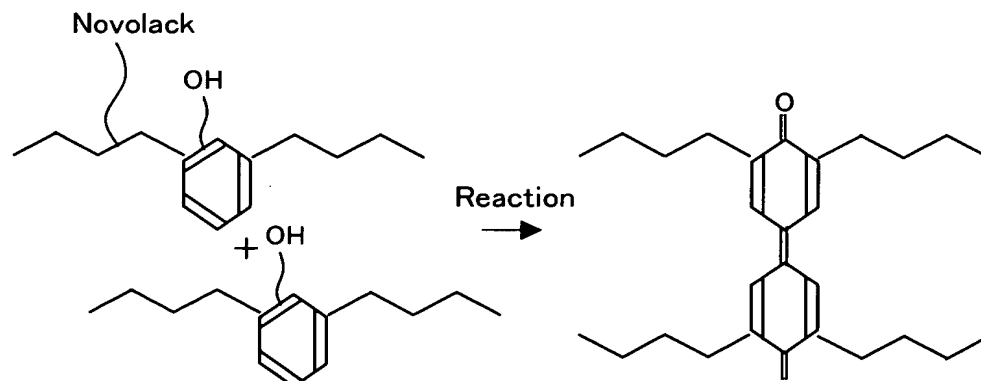




FIG. 71

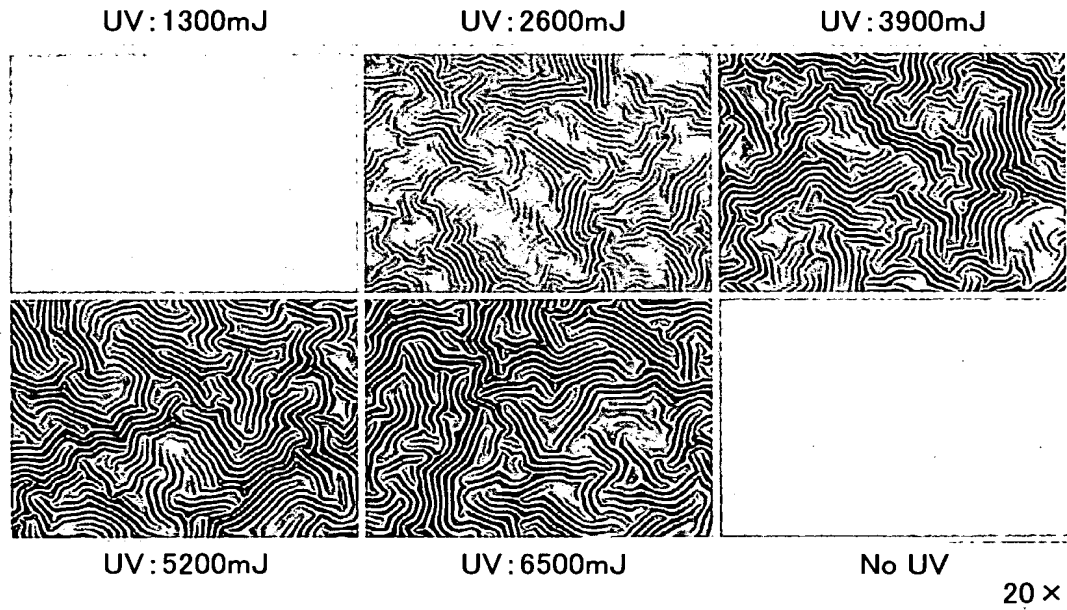


FIG. 72

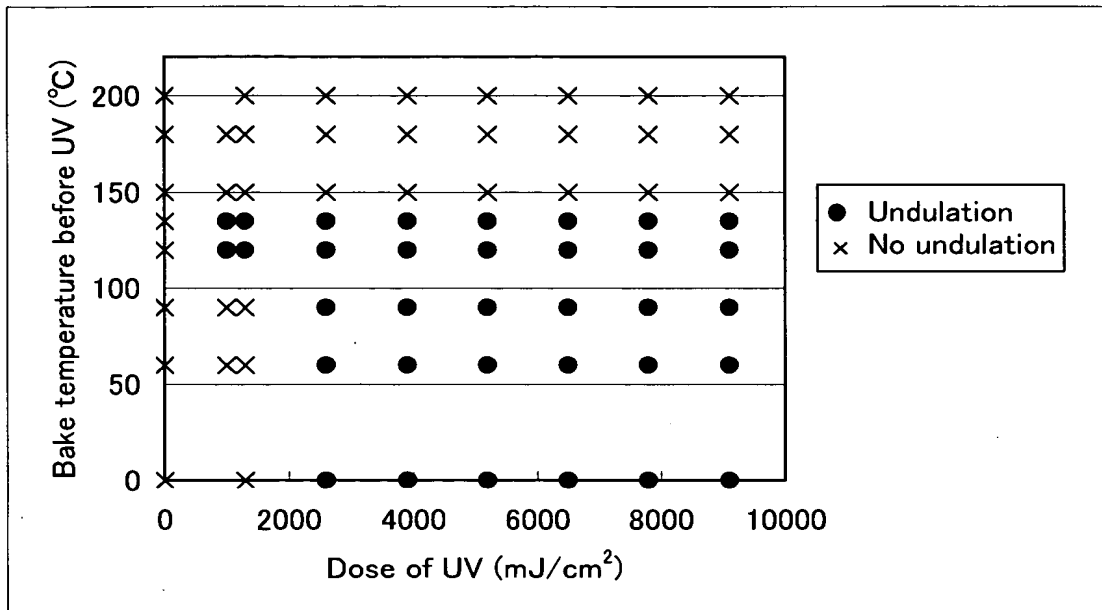


FIG. 73

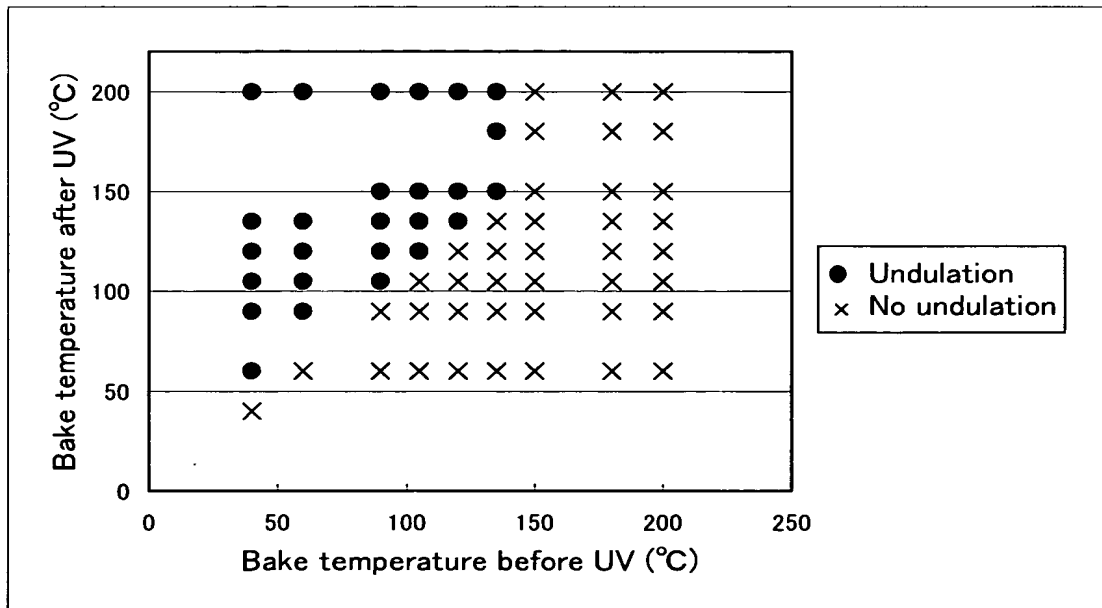


FIG. 74

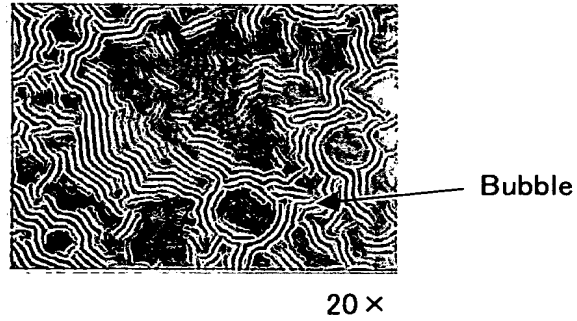
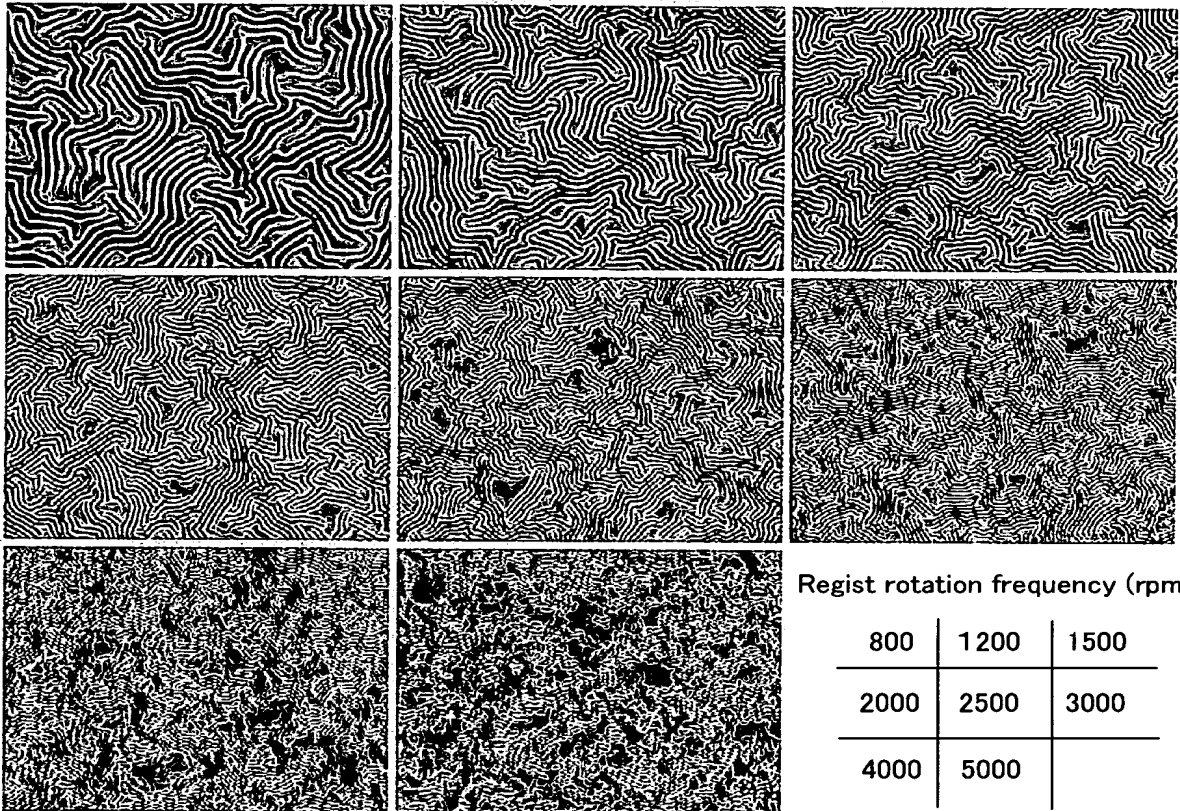


FIG. 75



20 ×

FIG. 76

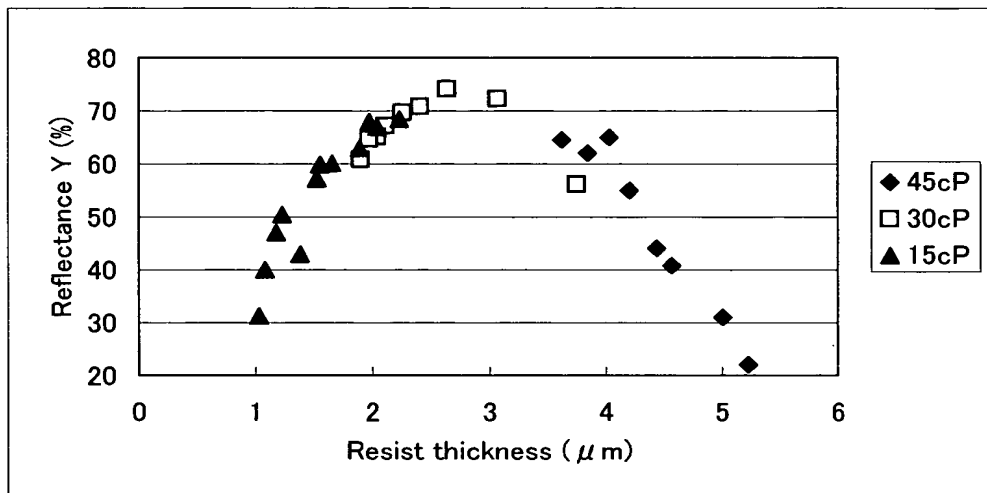


FIG. 77

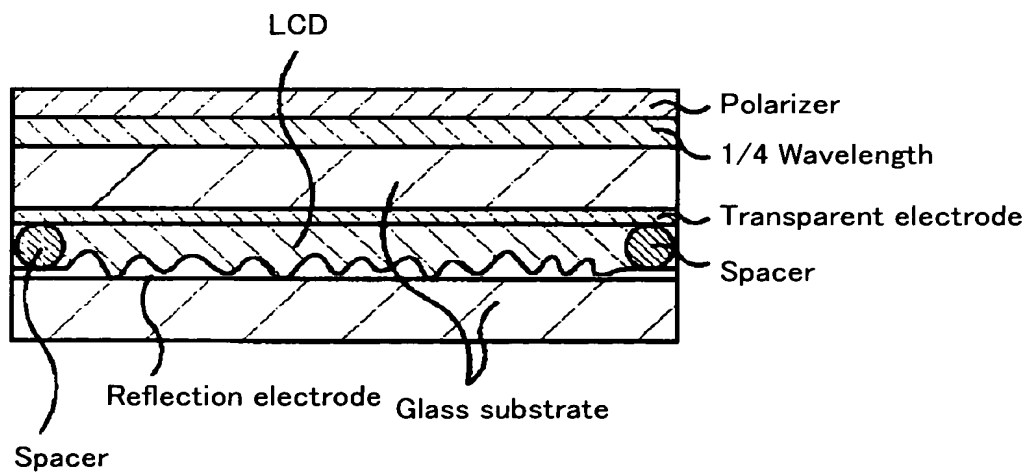


FIG. 78

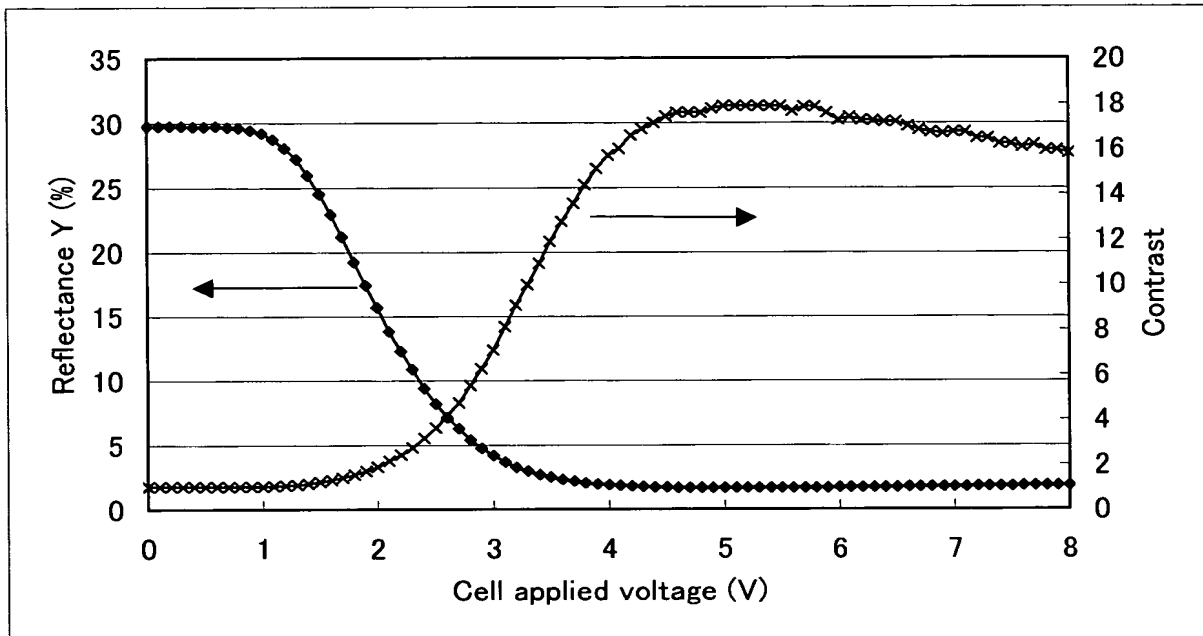


FIG. 79

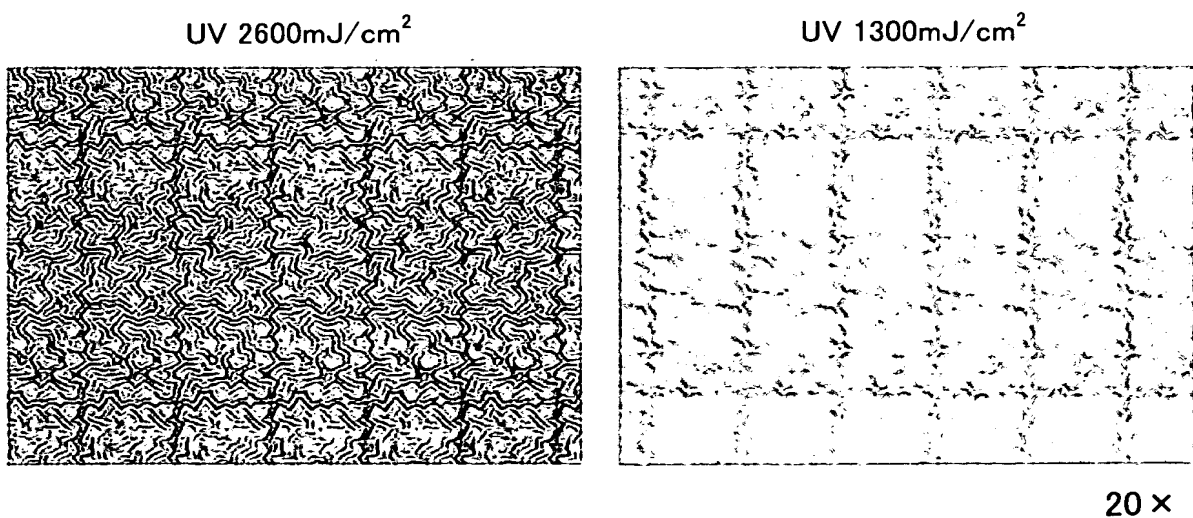
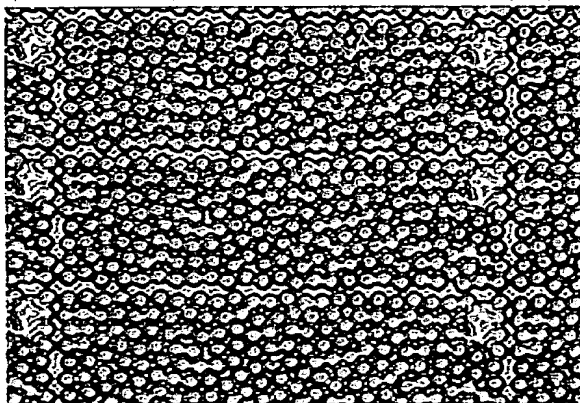
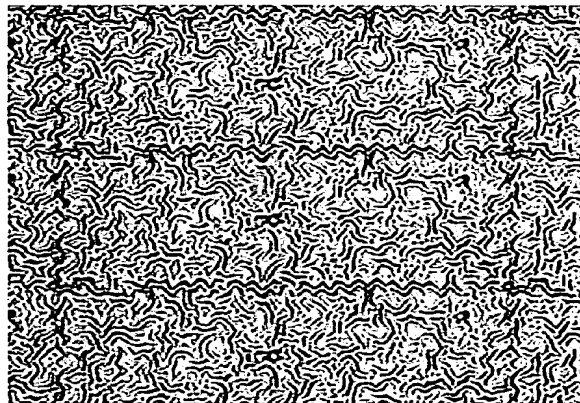


FIG. 80A



UV 80mJ/cm<sup>2</sup>

FIG. 80B



UV 35mJ/cm<sup>2</sup>

FIG. 81

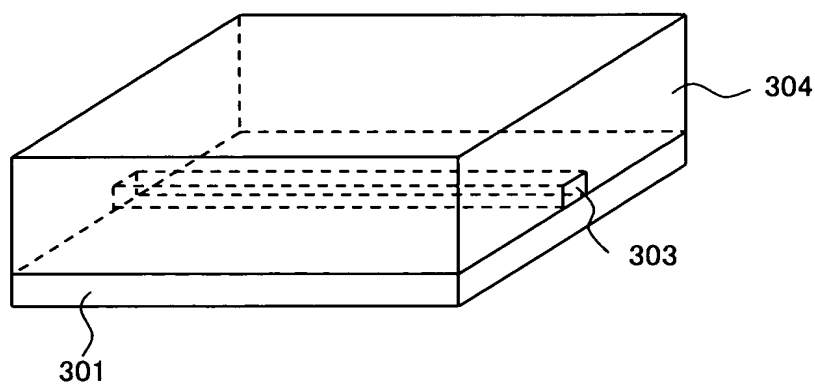
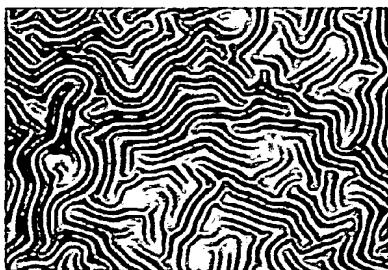
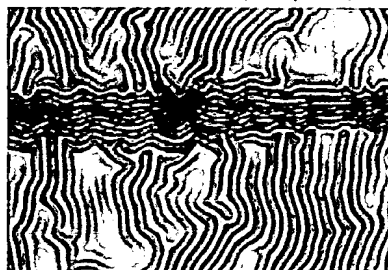


FIG. 82A



No undulation under resist

FIG. 82B



Undulation under resist

← Stripe undulation

20 ×

FIG. 83A

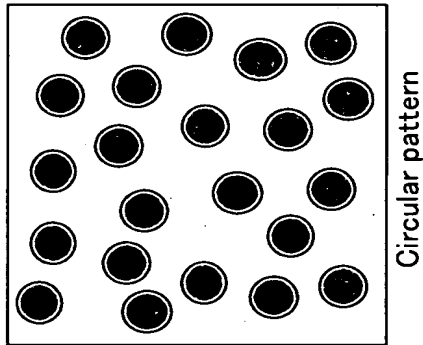


FIG. 83B

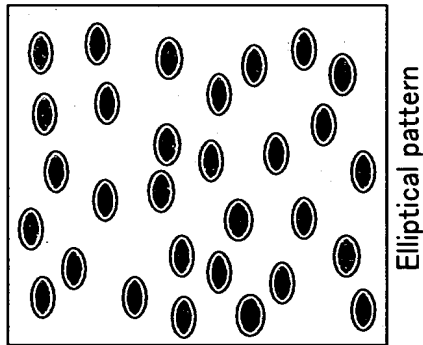


FIG. 83C

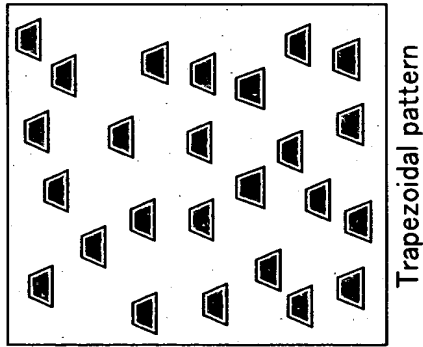


FIG. 83D

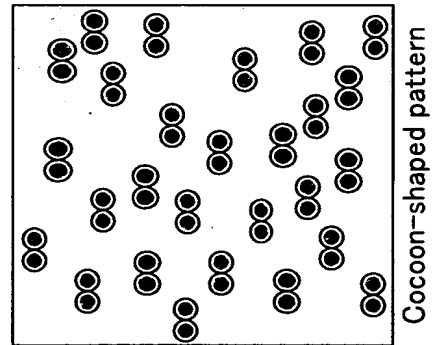


FIG. 83E

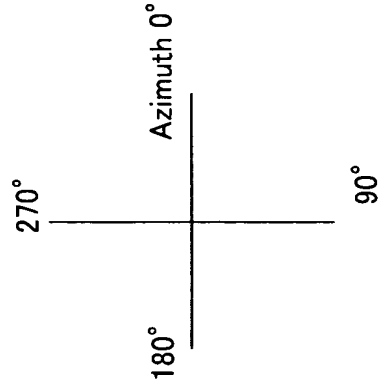
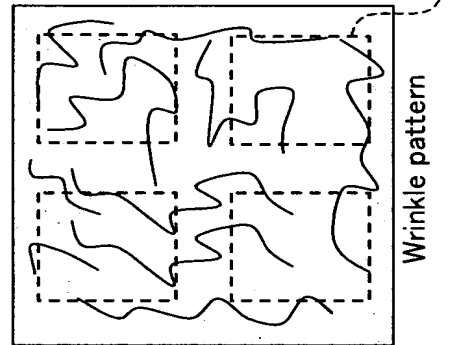


FIG. 84A

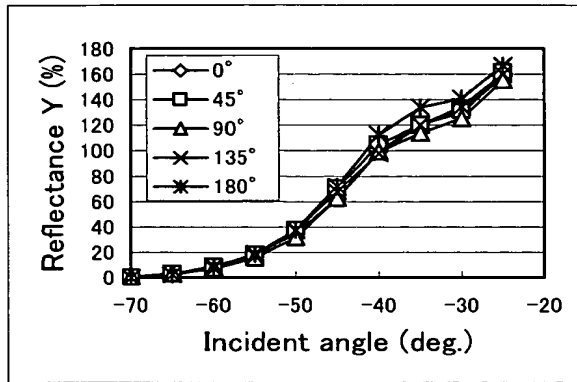


FIG. 84B

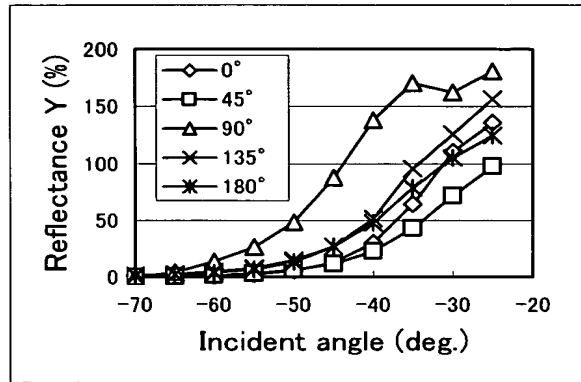


FIG. 84C

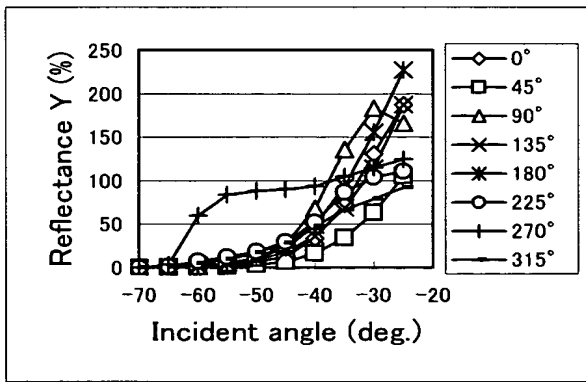


FIG. 84D

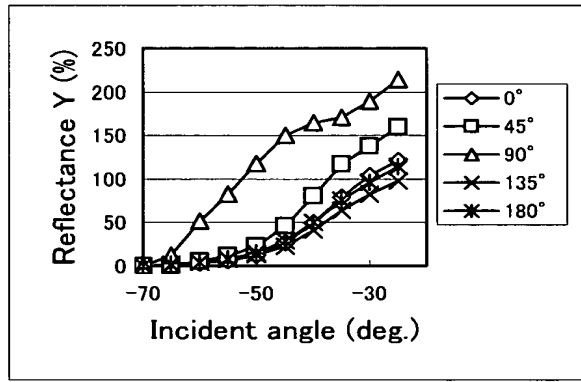


FIG. 84E

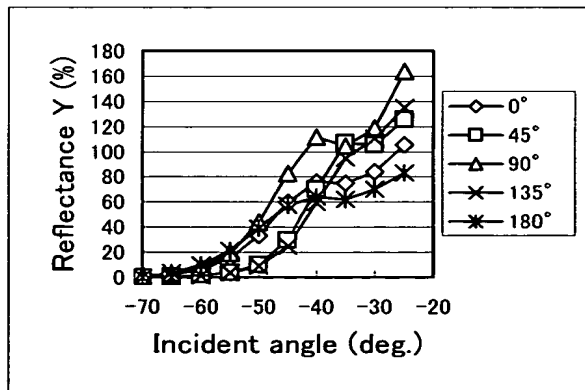




FIG. 85

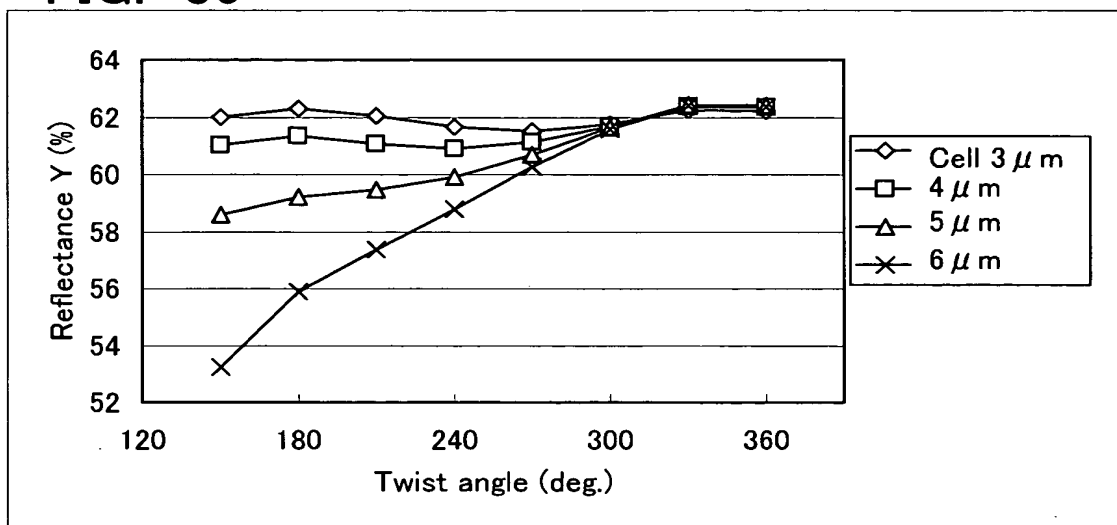


FIG. 86

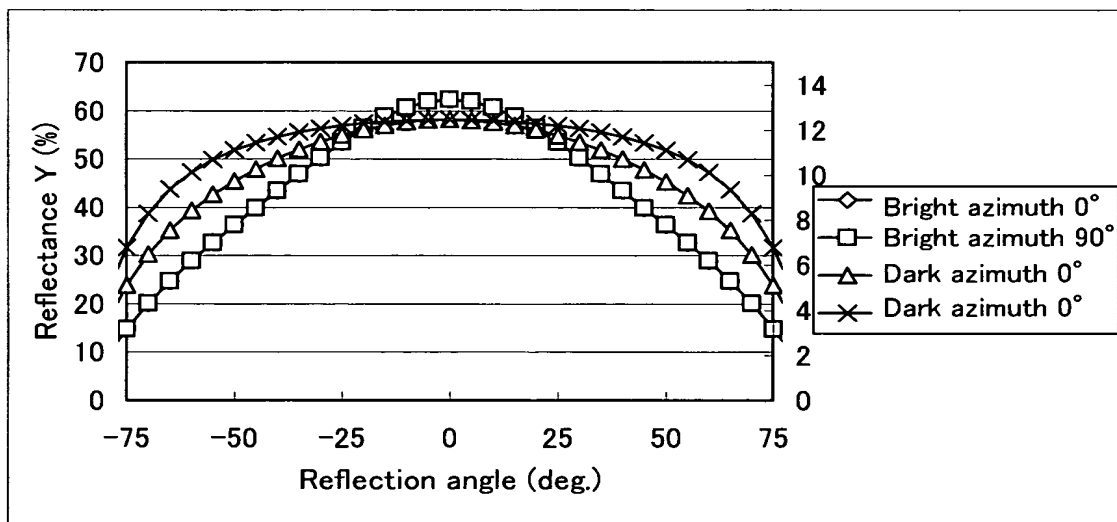


FIG. 87

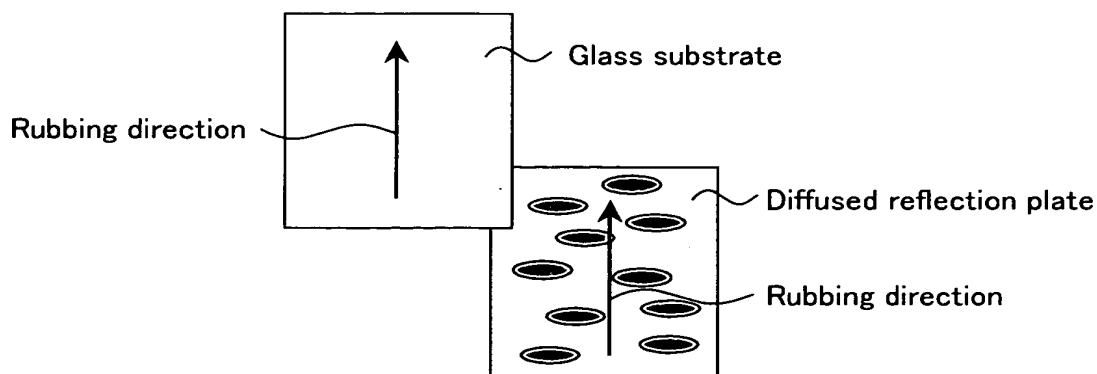


FIG. 88

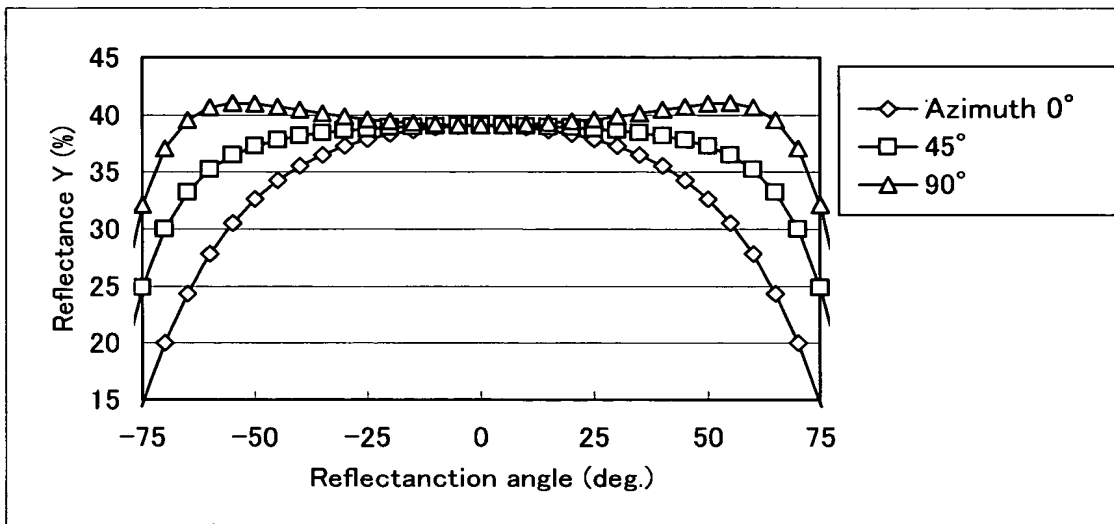
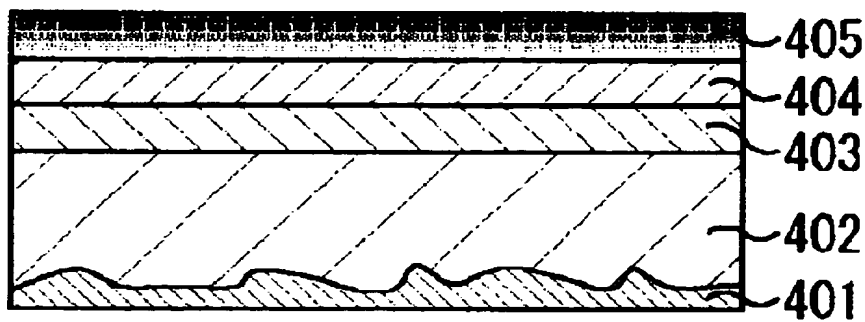


FIG. 89





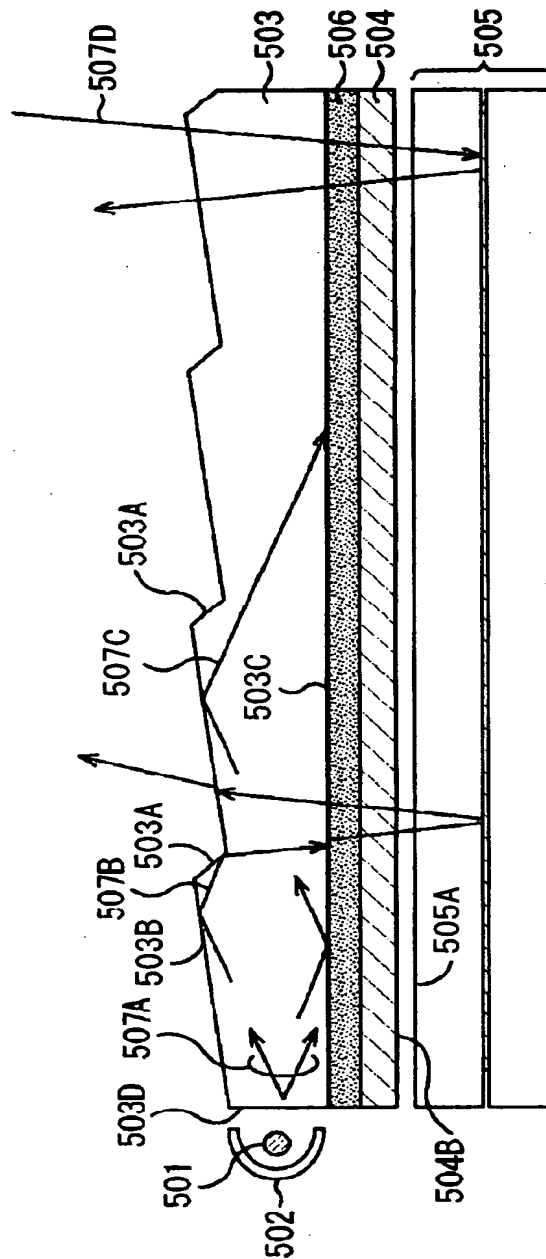




FIG. 93

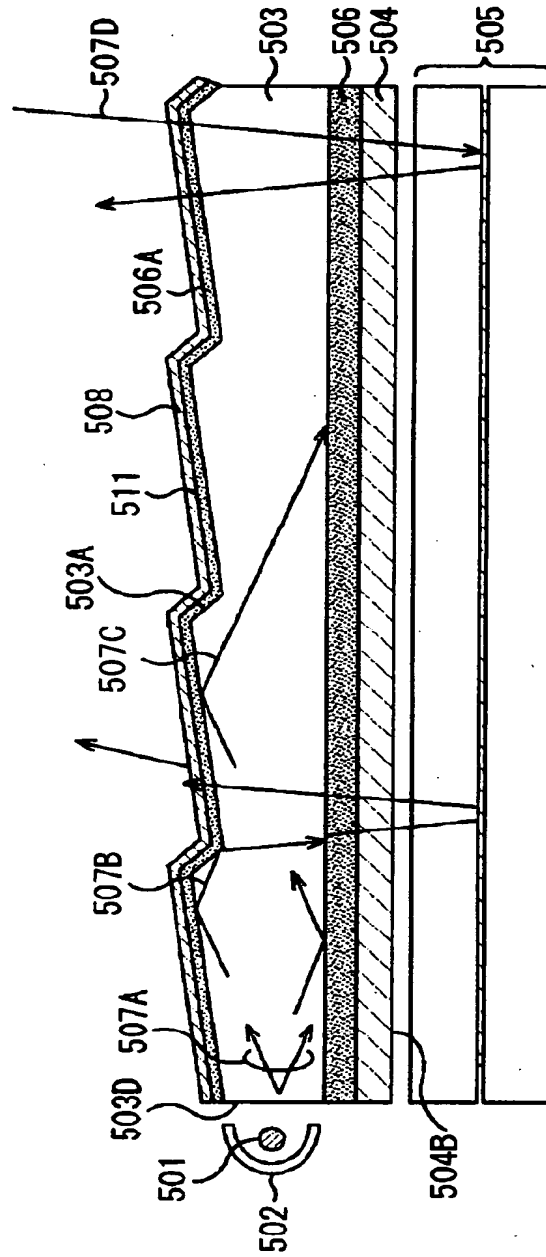
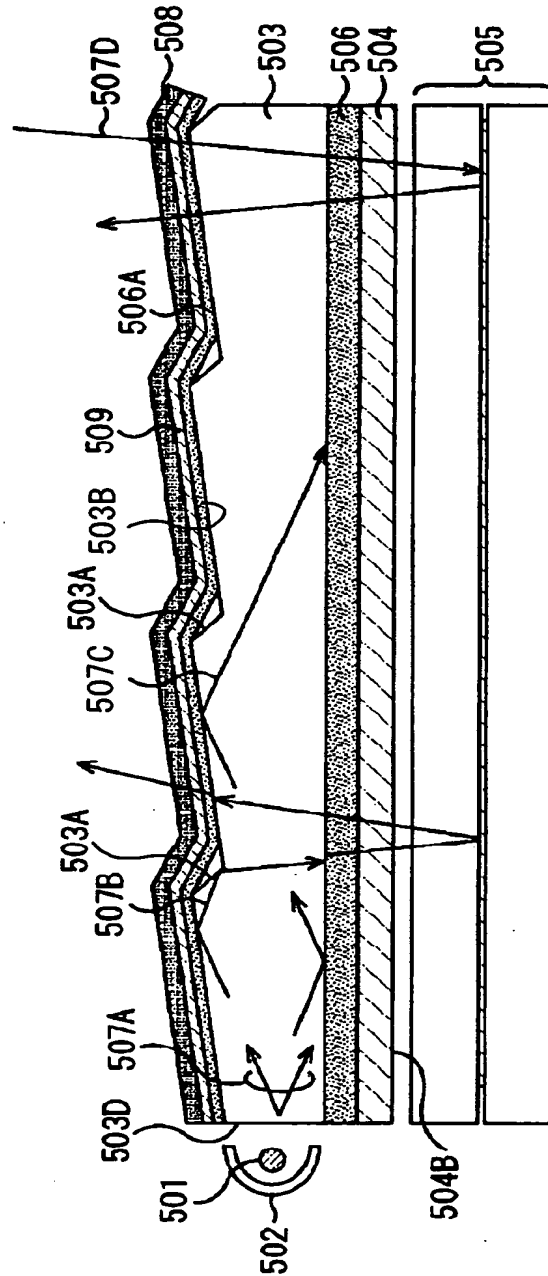


FIG. 94



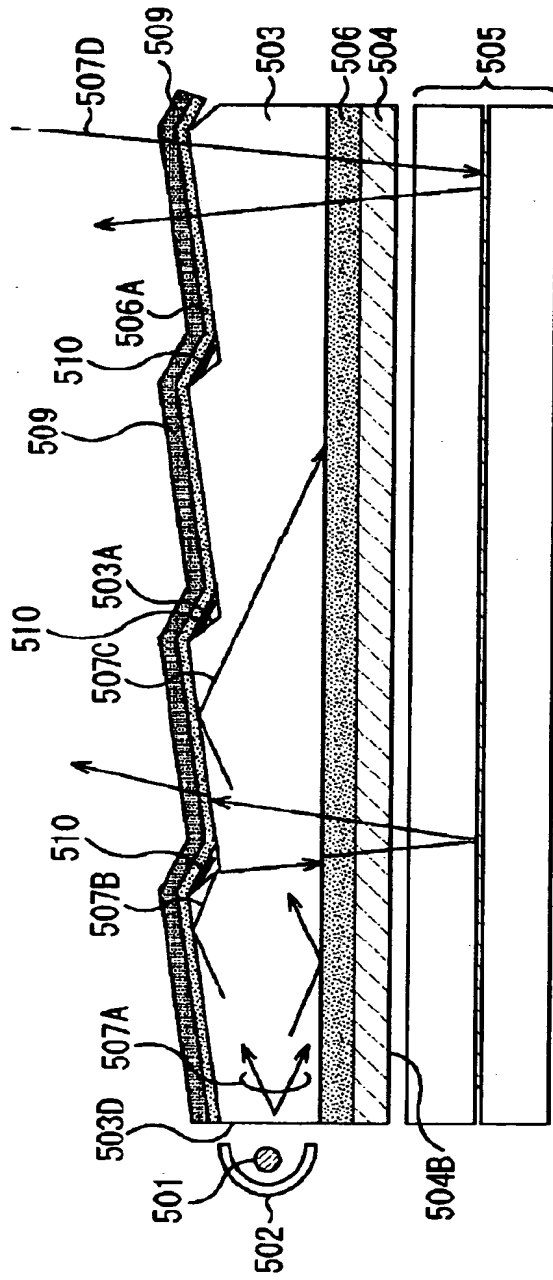


FIG. 95A

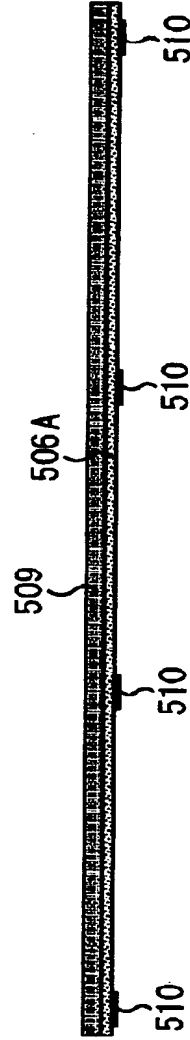


FIG. 95B



FIG. 96

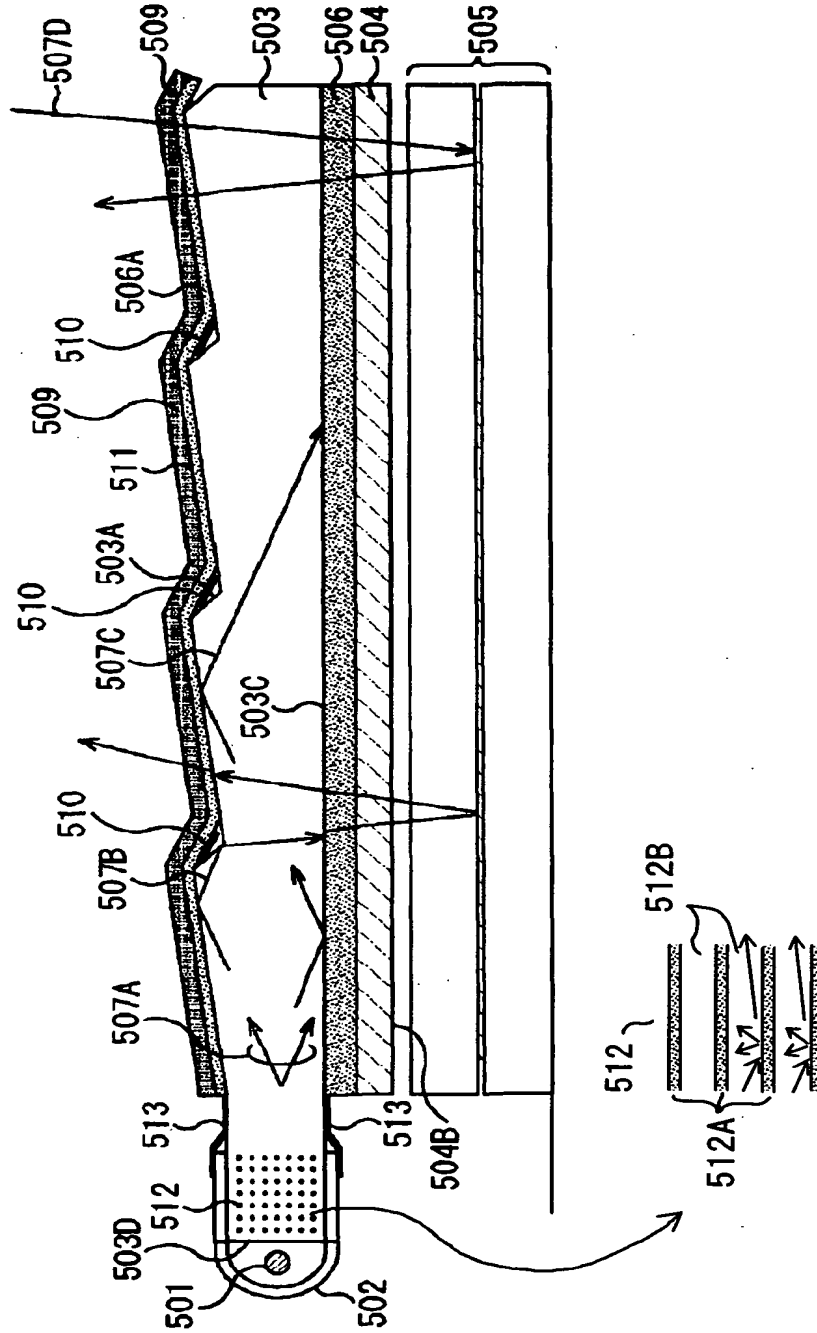


FIG. 97

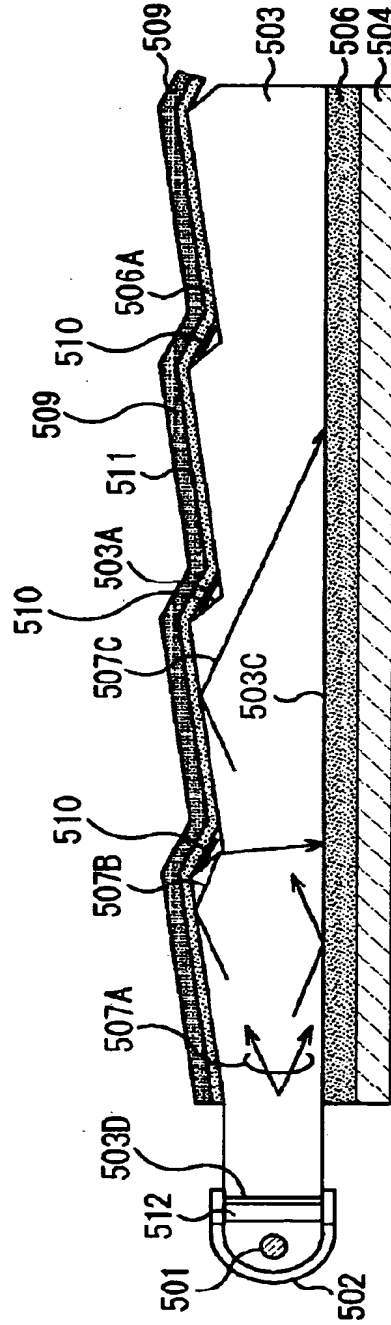


FIG. 98

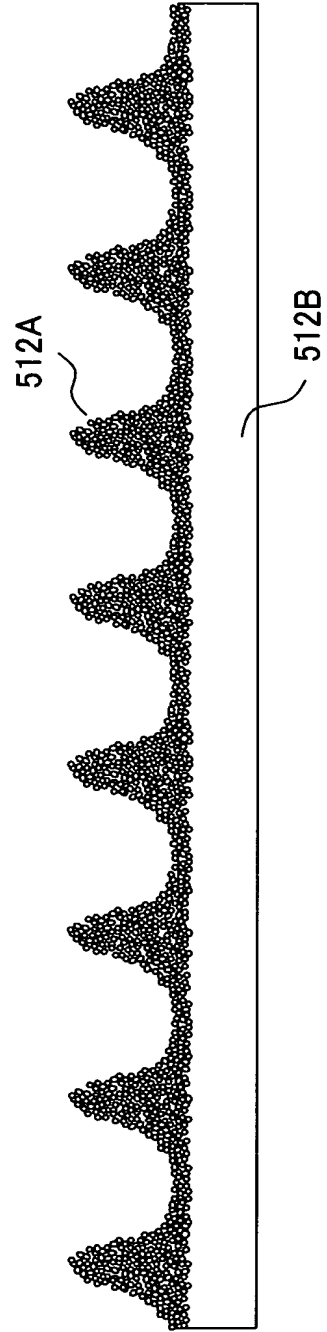


FIG. 99

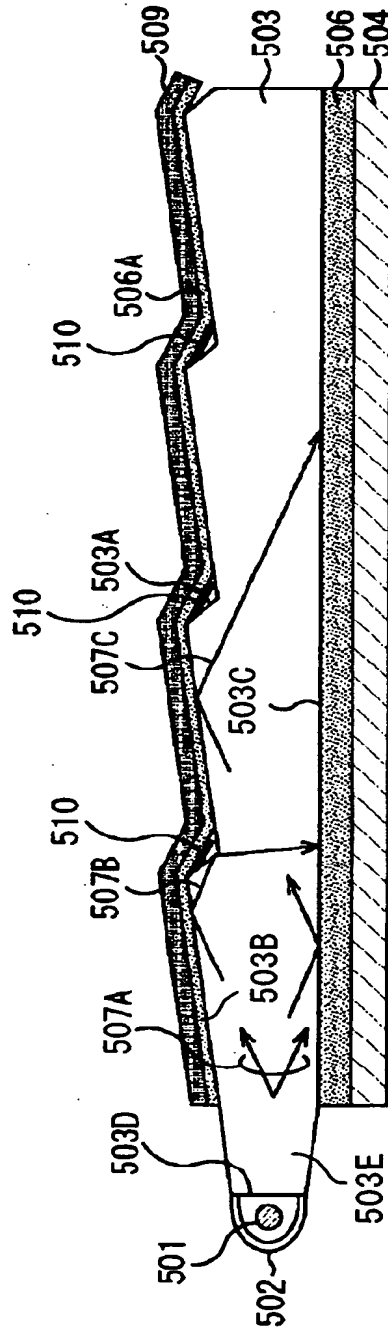


FIG. 100

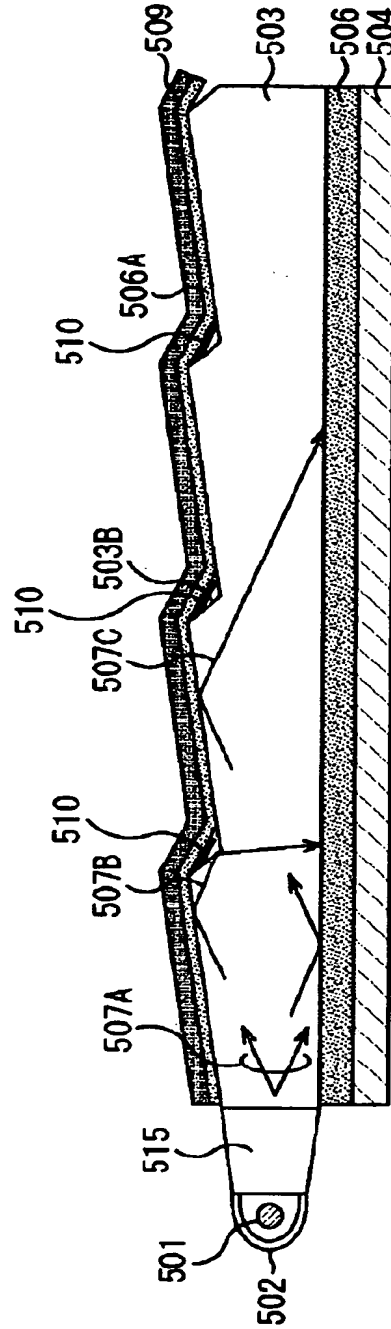
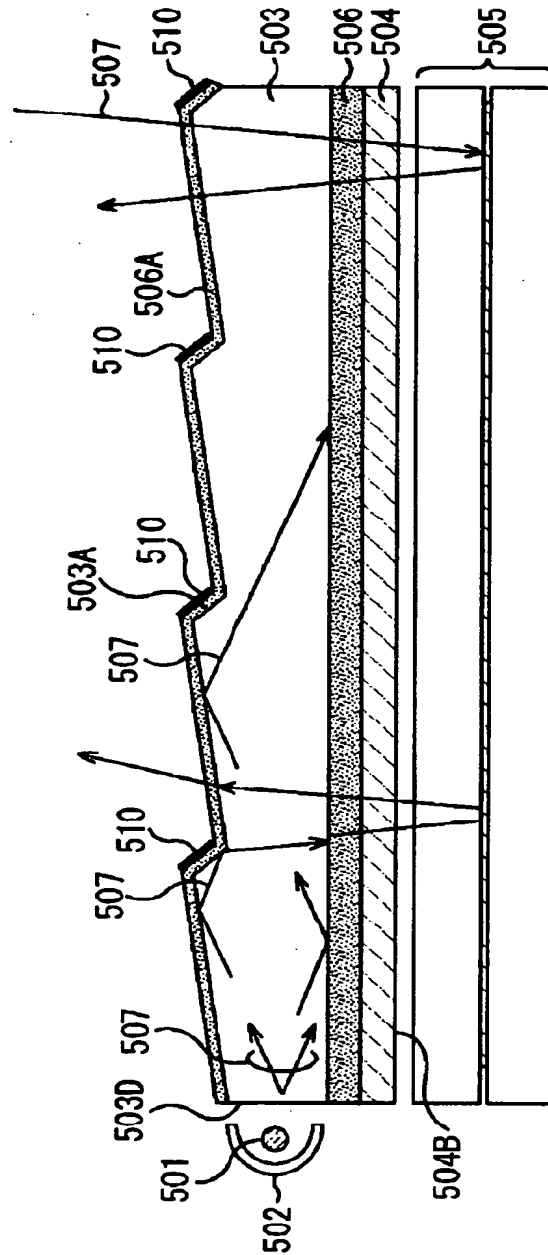


FIG. 101



This diagram shows a cross-sectional view of a multi-layered optical device. The device consists of several layers: a top layer 501, a layer 502, a layer 503, a layer 504, and a bottom layer 505. Light rays are shown entering from the left and passing through the layers. The light rays are labeled with reference numerals: 507A, 507B, 507C, 507D, 507E, 507F, 507G, 507H, 507I, 507J, 507K, 507L, 507M, 507N, 507O, 507P, 507Q, 507R, 507S, 507T, 507U, 507V, 507W, 507X, 507Y, 507Z, 507AA, 507AB, 507AC, 507AD, 507AE, 507AF, 507AG, 507AH, 507AI, 507AJ, 507AK, 507AL, 507AM, 507AN, 507AO, 507AP, 507AQ, 507AR, 507AS, 507AT, 507AU, 507AV, 507AW, 507AX, 507AY, 507AZ, 507BA, 507BB, 507BC, 507BD, 507BE, 507BF, 507BG, 507BH, 507BI, 507BJ, 507BK, 507BL, 507BM, 507BN, 507BO, 507BP, 507BQ, 507BR, 507BS, 507BT, 507BU, 507BV, 507BW, 507BX, 507BY, 507BZ, 507CA, 507CB, 507CC, 507CD, 507CE, 507CF, 507CG, 507CH, 507CI, 507CJ, 507CK, 507CL, 507CM, 507CN, 507CO, 507CP, 507CQ, 507CR, 507CS, 507CT, 507CU, 507CV, 507CW, 507CX, 507CY, 507CZ, 507DA, 507DB, 507DC, 507DD, 507DE, 507DF, 507DG, 507DH, 507DI, 507DJ, 507DK, 507DL, 507DM, 507DN, 507DO, 507DP, 507DQ, 507DR, 507DS, 507DT, 507DU, 507DV, 507DW, 507DX, 507DY, 507DZ, 507EA, 507EB, 507EC, 507ED, 507EE, 507EF, 507EG, 507EH, 507EI, 507EJ, 507EK, 507EL, 507EM, 507EN, 507EO, 507EP, 507EQ, 507ER, 507ES, 507ET, 507EU, 507EV, 507EW, 507EX, 507EY, 507EZ, 507FA, 507FB, 507FC, 507FD, 507FE, 507FF, 507FG, 507FH, 507FI, 507FJ, 507FK, 507FL, 507FM, 507FN, 507FO, 507FP, 507FQ, 507FR, 507FS, 507FT, 507FU, 507FV, 507FW, 507FX, 507FY, 507FZ, 507GA, 507GB, 507GC, 507GD, 507GE, 507GF, 507GG, 507GH, 507GI, 507GJ, 507GK, 507GL, 507GM, 507GN, 507GO, 507GP, 507GQ, 507GR, 507GS, 507GT, 507GU, 507GV, 507GW, 507GX, 507GY, 507GZ, 507HA, 507HB, 507HC, 507HD, 507HE, 507HF, 507HG, 507HH, 507HI, 507HJ, 507HK, 507HL, 507HM, 507HN, 507HO, 507HP, 507HQ, 507HR, 507HS, 507HT, 507HU, 507HV, 507HW, 507HX, 507HY, 507HZ, 507IA, 507IB, 507IC, 507ID, 507IE, 507IF, 507IG, 507IH, 507II, 507IJ, 507IK, 507IL, 507IM, 507IN, 507IO, 507IP, 507IQ, 507IR, 507IS, 507IT, 507IU, 507IV, 507IW, 507IX, 507IY, 507IZ, 507JA, 507JB, 507JC, 507JD, 507JE, 507JF, 507JG, 507JH, 507JI, 507JJ, 507JK, 507JL, 507JM, 507JN, 507JO, 507JP, 507JQ, 507JR, 507JS, 507JT, 507JU, 507JV, 507JW, 507JX, 507JY, 507JZ, 507KA, 507KB, 507KC, 507KD, 507KE, 507KF, 507KG, 507KH, 507KI, 507KJ, 507KK, 507KL, 507KM, 507KN, 507KO, 507KP, 507KQ, 507KR, 507KS, 507KT, 507KU, 507KV, 507KW, 507KX, 507KY, 507KZ, 507LA, 507LB, 507LC, 507LD, 507LE, 507LF, 507LG, 507LH, 507LI, 507LJ, 507LK, 507LL, 507LM, 507LN, 507LO, 507LP, 507LQ, 507LR, 507LS, 507LT, 507LU, 507LV, 507LW, 507LX, 507LY, 507LZ, 507MA, 507MB, 507MC, 507MD, 507ME, 507MF, 507MG, 507MH, 507MI, 507MJ, 507MK, 507ML, 507MN, 507MO, 507MP, 507MQ, 507MR, 507MS, 507MT, 507MU, 507MV, 507MW, 507MX, 507MY, 507MZ, 507NA, 507NB, 507NC, 507ND, 507NE, 507NF, 507NG, 507NH, 507NI, 507NJ, 507NK, 507NL, 507NM, 507NO, 507NP, 507NQ, 507NR, 507NS, 507NT, 507NU, 507NV, 507NW, 507NX, 507NY, 507NZ, 507OA, 507OB, 507OC, 507OD, 507OE, 507OF, 507OG, 507OH, 507OI, 507OJ, 507OK, 507OL, 507OM, 507ON, 507OO, 507OP, 507OQ, 507OR, 507OS, 507OT, 507OU, 507OV, 507OW, 507OX, 507OY, 507OZ, 507PA, 507PB, 507PC, 507PD, 507PE, 507PF, 507PG, 507PH, 507PI, 507PJ, 507PK, 507PL, 507PM, 507PN, 507PO, 507PP, 507PQ, 507PR, 507PS, 507PT, 507PU, 507PV, 507PW, 507PX, 507PY, 507PZ, 507QA, 507QB, 507QC, 507QD, 507QE, 507QF, 507QG, 507QH, 507QI, 507QJ, 507QK, 507QL, 507QM, 507QN, 507QO, 507QP, 507QQ, 507QR, 507QS, 507QT, 507QU, 507QV, 507QW, 507QX, 507QY, 507QZ, 507RA, 507RB, 507RC, 507RD, 507RE, 507RF, 507RG, 507RH, 507RI, 507RJ, 507RK, 507RL, 507RM, 507RN, 507RO, 507RP, 507RQ, 507RR, 507RS, 507RT, 507RU, 507RV, 507RW, 507RX, 507RY, 507RZ, 507SA, 507SB, 507SC, 507SD, 507SE, 507SF, 507SG, 507SH, 507SI, 507SJ, 507SK, 507SL, 507SM, 507SN, 507SO, 507SP, 507SQ, 507SR, 507SS, 507ST, 507SU, 507SV, 507SW, 507SX, 507SY, 507SZ, 507TA, 507TB, 507TC, 507TD, 507TE, 507TF, 507TG, 507TH, 507TI, 507TJ, 507TK, 507TL, 507TM, 507TN, 507TO, 507TP, 507TQ, 507TR, 507TS, 507TT, 507TU, 507TV, 507TW, 507TX, 507TY, 507TZ, 507UA, 507UB, 507UC, 507UD, 507UE, 507UF, 507UG, 507UH, 507UI, 507UJ, 507UK, 507UL, 507UM, 507UN, 507UO, 507UP, 507UQ, 507UR, 507US, 507UT, 507UU, 507UV, 507UW, 507UX, 507UY, 507UZ, 507VA, 507VB, 507VC, 507VD, 507VE, 507VF, 507VG, 507VH, 507VI, 507VJ, 507VK, 507VL, 507VM, 507VN, 507VO, 507VP, 507VQ, 507VR, 507VS, 507VT, 507VU, 507VV, 507VW, 507VX, 507VY, 507VZ, 507WA, 507WB, 507WC, 507WD, 507WE, 507WF, 507WG, 507WH, 507WI, 507WJ, 507WK, 507WL, 507WM, 507WN, 507WO, 507WP, 507WQ, 507WR, 507WS, 507WT, 507WU, 507WV, 507WW, 507WX, 507WY, 507WZ, 507XA, 507XB, 507XC, 507XD, 507XE, 507XF, 507XG, 507XH, 507XI, 507XJ, 507XK, 507XL, 507XM, 507XN, 507XO, 507XP, 507XQ, 507XR, 507XS, 507XT, 507XU, 507XV, 507XW, 507XX, 507XY, 507XZ, 507YA, 507YB,

FIG. 103

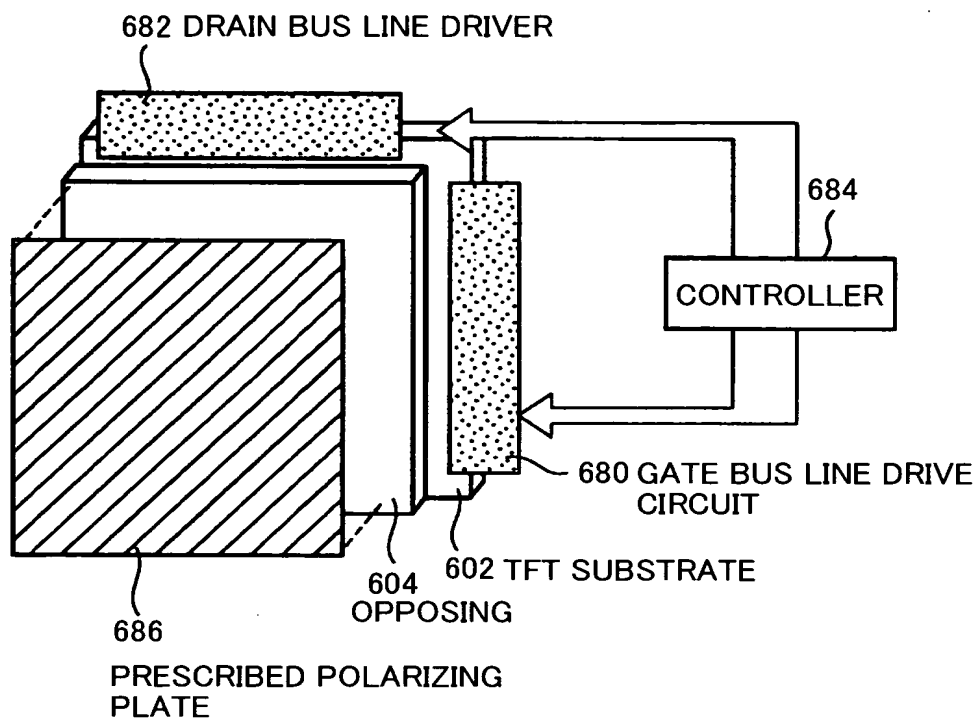




FIG. 104

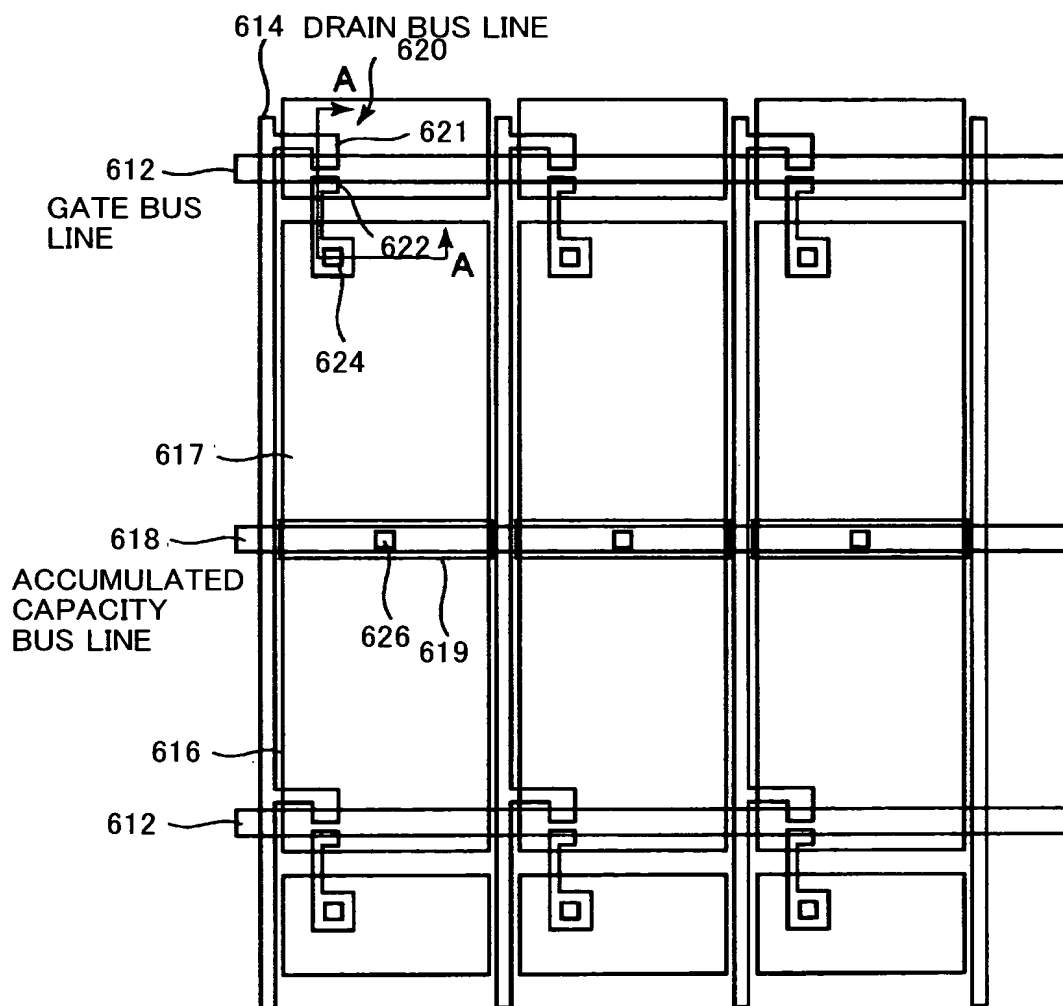


FIG. 105

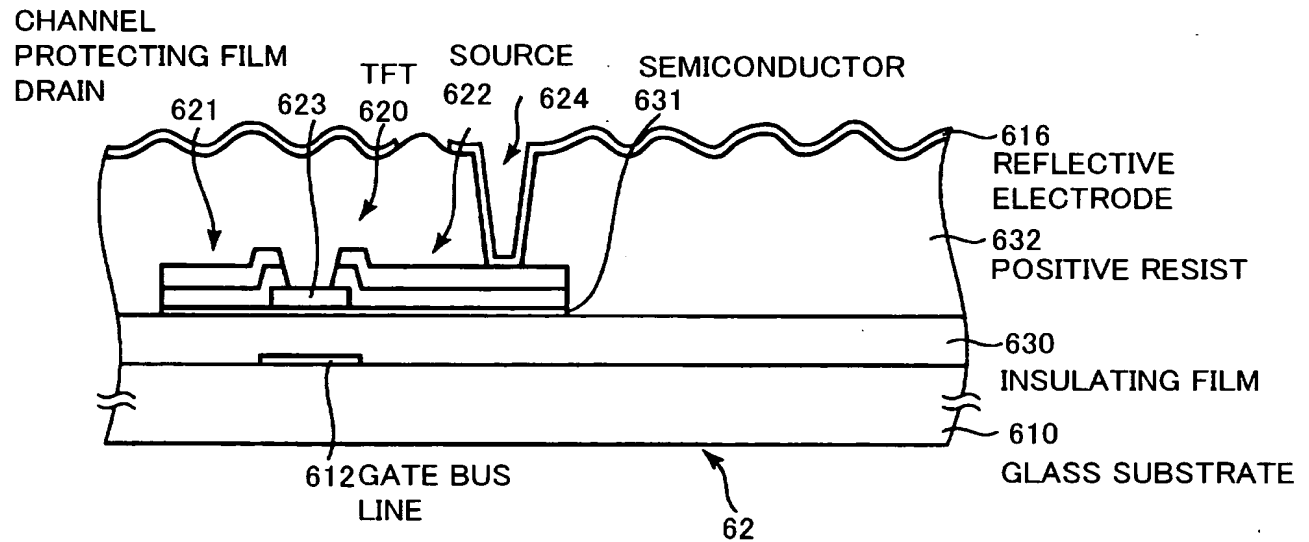


FIG. 106

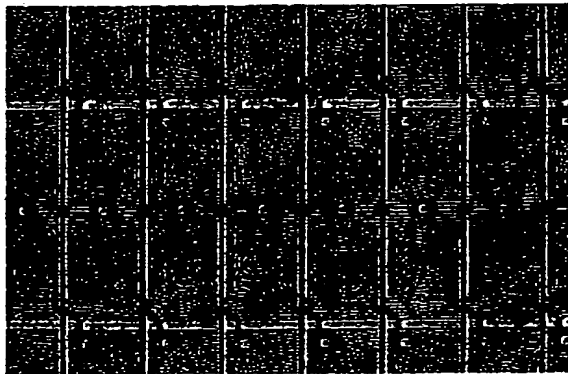


FIG. 107

PROCESS	EMBODIMENT 1		COMPARATIVE EXAMPLE	EMBODIMENT 2	
RESIST COATING					
PRE-BAKING	110°C 200sec	110°C 200sec	110°C 200sec	70°C 200sec	80~130°C 200sec
EXPOSURE/ DEVELOPMENT					
BAKING PRIOR TO UV IRRADIATION	135°C 80min		135°C 80min		
UV IRRADIATION	65mW/cm <sup>2</sup> 40sec	65mW/cm <sup>2</sup> 40sec	12mW/cm <sup>2</sup> 5~440sec	12mW/cm <sup>2</sup> 217sec	
ANNEAL	215°C 60min	215°C 60min	215°C 60min	215°C 60min	
FORMATION OF WRINKLE-SHAPED UNDULATIONS	○	○	x	x	○

FIG. 108A

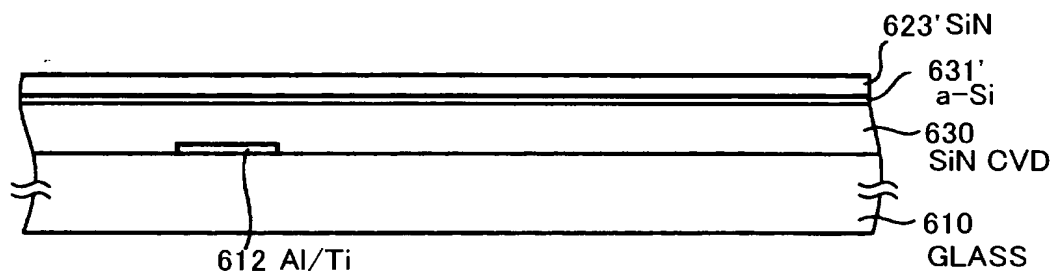


FIG. 108B

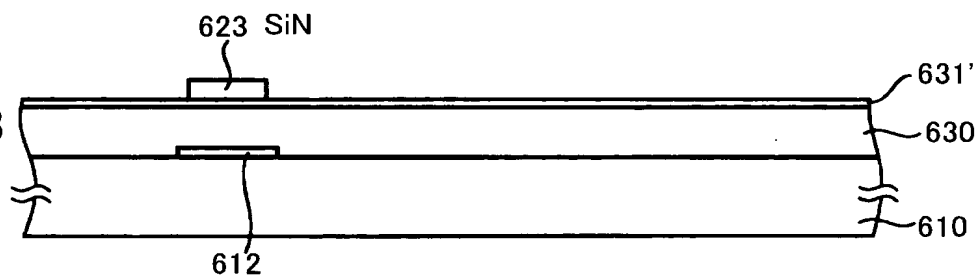


FIG. 108C

